

# **A1-F18AC-460-100**

**15 JANUARY 1992**

**CHANGE 3 - 1 MARCH 1996**

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## **TECHNICAL MANUAL**

### **ORGANIZATIONAL MAINTENANCE PRINCIPLES OF OPERATION**

## **FUEL SYSTEM**

**NAVY MODEL  
F/A-18A AND F/A-18B  
161353 AND UP**

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**NATECELECTRONICMANUAL**

## NUMERICAL INDEX OF EFFECTIVE WORK PACKAGES/PAGES

### List of Current Changes

Original 0 . . . . . 15 Jan 1992      Change 1 . . . . . 1 Oct 1992      Change 2 . . . . . 15 Sep 1994      Change 3 . . . . . 1 Mar 1996

Only those work packages/pages assigned to the manual are listed in this index. Insert Change 3, dated 1 March 1996. Dispose of superseded and deleted work packages/pages. Superseded and deleted classified work packages/pages shall be destroyed in accordance with applicable regulations. If changed pages are issued to a work package, insert the changed pages in the applicable work package. The portion of text affected in a changed or revised work package is indicated by change bars or the change symbol "R" in the outer margin of each column of text. Changes to illustrations are indicated by pointing hands or change bars, as applicable.

Total number of pages in this manual is 458, consisting of the following:

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2 . . . . .	.0	13 . . . . .	.0	3 . . . . .	.0	5 . . . . .	.0
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002 00		17 . . . . .	.0	7 . . . . .	.0	9 . . . . .	.0
1 . . . . .	.2	18 . . . . .	.0	8 . . . . .	.0	10 . . . . .	.0
2 . . . . .	.2	19 . . . . .	.0	9 . . . . .	.0	11 . . . . .	.0
3 . . . . .	.2	20 . . . . .	.0	10 Blank . . . . .	.0	12 . . . . .	.0
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8 Blank . . . . .	.2	25 . . . . .	.0	4 . . . . .	.0	17 . . . . .	.0
003 00		26 . . . . .	.0	5 . . . . .	.0	18 Blank . . . . .	.0
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6 . . . . .	.0	32 . . . . .	.0	11 . . . . .	.1	5 . . . . .	.0
7 . . . . .	.0	33 . . . . .	.0	12 . . . . .	.0	6 . . . . .	.0
8 . . . . .	.0	34 . . . . .	.0	13 . . . . .	.0	7 . . . . .	.0
9 . . . . .	.0	35 . . . . .	.0	14 . . . . .	.0	8 . . . . .	.0
10 . . . . .	.0	36 . . . . .	.0	15 . . . . .	.0	9 . . . . .	.0
003 01		37 . . . . .	.0	16 . . . . .	.0	10 . . . . .	.0
1 . . . . .	.1	38 . . . . .	.0	005 00		11 . . . . .	.0
2 . . . . .	.0	39 . . . . .	.0	1 . . . . .	.0	12 . . . . .	.0
3 . . . . .	.0	40 . . . . .	.0	2 . . . . .	.0	13 . . . . .	.0
4 . . . . .	.0	41 . . . . .	.0	3 . . . . .	.0	14 Blank . . . . .	.0

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3 .....0		12 .....0		17 .....0		7 .....0	
4 .....0		13 .....0		18 .....0		8 .....0	
5 .....0		14 Blank .....0		19 .....0		9 .....0	
6 Blank .....0		012 00		20 .....0		10 .....0	
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6 .....0		21 .....0		53 .....0		9 .....0	
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16 Blank .....0		4 .....0		2 .....0		1 .....0	
011 00		5 .....0		3 .....0		2 .....0	
1 .....1		6 .....0		4 .....0		3 .....0	
2 .....0		7 .....0		5 .....0		4 .....0	
3 .....0		8 .....0		6 Blank .....0		5 .....0	
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4	.0	16	.0	2	.0	7	.0
5	.0	17	.0	3	.0	8	.0
6	.0	18	.0	4	.0	023 02	
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3	.3	3	.0	1	.2	6	.0
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10	.0	2	.0	4 Blank	.0	20 Blank	.0
11	.0	3	.0	023 01			
		4	.0	1	.0		
				2	.0		



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**LIST OF TECHNICAL PUBLICATIONS DEFICIENCY REPORTS INCORPORATED**

**ORGANIZATIONAL MAINTENANCE**

**FUEL SYSTEM**

**This WP supersedes TPDR WP, dated 15 September 1994.**

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1. The TPDRs listed below have been incorporated in this issue.

REPORT CONTROL NUMBER	LOCATION
N66050-95-0113	WP019 00 Pg. 2



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003 01	Fuel Storage System Operation		Operation
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012 01	Internal Fuel Transfer System	023 00	Fuel Quantity Low Level Warning
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	Component Locator		System Component Locator

WP Number	Title
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**INTRODUCTION**  
**ORGANIZATIONAL MAINTENANCE**  
**PRINCIPLES OF OPERATION**  
**FUEL SYSTEM**

**This work package supersedes WP002 00, dated 15 January 1992.**

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**1. PURPOSE.**

2. This manual provides the technician with a general understanding of how the various components function in the system.

**3. REQUISITIONING AND DISTRIBUTION OF NAVAIR TECHNICAL PUBLICATIONS.**

4. Procedures to be used by naval activities and other Department of Defense activities requiring NAVAIR technical manuals are defined in NAVAIR 00-25-100 and NAVAIRINST 5605.5.

5. To automatically receive future changes and revisions to NAVAIR technical manuals, an activity must be established on the Automatic Distribution Requirements List (ADRL) maintained by the Naval Air Technical Services Facility (NAVAIRTECHSERVFAC). To become established on the ADRL, notify your activity central technical publications librarian. If your activity does not have a library, you may establish your automatic distribution requirements by contacting the Commanding Officer, NAVAIRTECHSERVFAC, Attn: Code 321, 700 Robbins Avenue, Philadelphia, PA 19111-5097. Annual reconfirmation of these requirements is necessary to remain on automatic distribution. Please use your NAVAIRTECHSERVFAC assigned account number whenever referring to automatic distribution requirements.

6. If additional or replacement copies of this manual are required with no attendant changes in the ADRL, they may be ordered by submitting requisitions directly to the Commanding Officer, Naval Aviation Supply Office, Naval Publications and Forms Directorate, 5801 Tabor Road, Philadelphia, PA 19120-5099.

**7. CONTENT.**

8. Work packages contain description and operation of systems, subsystems, and components. The text is supported by component locators, block diagrams and simplified schematics.

9. **COMPONENT LOCATOR.** The component locator shows aircraft component location. The illustration shows the technicians view when possible.

10. **BLOCK DIAGRAMS.** Block diagrams consist primarily of blocks connected by lines. These diagrams portray the function of a system or subsystem.

11. **SIMPLIFIED SCHEMATICS.** Simplified schematics consist primarily of blocks connected by single lines with limited use of symbols and pictorial drawings of units. These schematics simplify system functions as much as possible. All schematics are shown with electrical power off, switches in off positions, and relays in deenergized position unless noted on schematic.

**12. SCHEMATIC HIGHLIGHTS.**

13. For schematic highlights see figure 1.

**14. MANUAL ISSUE DATE.**

15. The date on the title page is the copy freeze date. No additions, deletions, or changes are made after the manual issue date except last minute safety of flight or required maintenance changes. Data collected after the manual issue date will be included in later changes or revisions of the manual.

## 16. EFFECTIVITIES.

17. Effectivity notes on manual title pages, work package title pages, and within a work package indicate the aircraft or software program to which the data applies. If no effectivity note appears on the work package title page, the work package has the same effectivity as shown on the manual title page. The effectivity notes may use:

### NOTE

Aircraft with model designator F/A-18B are the same type and model as TF/A-18A.

a. Type, model, and series

b. Bureau number (tail number)

c. Combination of type, model, series, and bureau numbers

d. Part number or serial number

e. Technical directive number

f. Configuration/identification number

18. The table below shows examples of effectivity notes and their meanings:

### Effectivity Note Examples

Effectivity Note	Definition
160777 AND UP	Applicable to all F/A-18A, F/A-18B, F/A-18C and F/A-18D for bureau numbers listed.
F/A-18A, F/A-18B	Applicable to all F/A-18A and F/A-18B.
F/A-18C, F/A-18D	Applicable to all F/A-18C and F/A-18D.
F/A-18A	Applicable to all F/A-18A, but not F/A-18B, F/A-18C, and F/A-18D.
F/A-18B	Applicable to all F/A-18B, but not F/A-18A, F/A-18C, and F/A-18D.
F/A-18C	Applicable to all F/A-18C, but not F/A-18A, F/A-18B, and F/A-18D.
F/A-18D	Applicable to all F/A-18D, but not F/A-18A, F/A-18B, and F/A-18C.
F/A-18A, F/A-18C	Applicable to all F/A-18A and F/A-18C, but not to F/A-18B and F/A-18D.
F/A-18B, F/A-18D	Applicable to all F/A-18B and F/A-18D, but not to F/A-18A and F/A-18C.
F/A-18A 160775, 160777 THRU 160782	Only applicable to some bureau numbers of F/A-18A. Not applicable to any F/A-18B, even if a F/A-18B bureau number is within the numbers listed.
F/A-18C 163427, 163430 THRU 163456	Only applicable to some bureau numbers of F/A-18C. Not applicable to any F/A-18D, even if a F/A-18D bureau number is within the numbers listed.
F/A-18B 160784 AND UP	Only applicable to some bureau numbers of F/A-18B. Not applicable to any F/A-18A, even if an F/A-18A bureau number is within the numbers listed.



## Effectivity Note Examples (Cont)

Effectivity Note	Definition
F/A-18D 163434 THRU 163457	Only applicable to some bureau numbers of F/A-18D. Not applicable to any F/A-18C, even if a F/A-18C bureau number is within the numbers listed.
160775 THRU 160785 BEFORE F/A-18 AFC 772	Applicable to F/A-18A and F/A-18B for bureau numbers listed, before modification by technical directive.
161213 AND UP; ALSO 160775 THRU 160785 AFTER F/A-18 AFC 772	Applicable to aircraft modified during production, also applicable when affected aircraft have been modified by technical directive.
160775 THRU 160785; WHEN NO. 2 CONTROL PANEL P/N XXXX-X IS INSTALLED	Applicable to F/A-18A and F/A-18B for bureau numbers listed if panel P/N XXXX-X is installed. (Configuration before AVC)
161213 AND UP; ALSO 160775 THRU 160785; WHEN NO. 2 CONTROL PANEL P/N XXXX-Y (AVC-102) IS INSTALLED	Applicable to aircraft modified during production - also applicable to aircraft components modified to the production configuration by technical directive. (Configuration after AVC)
P/N MBEU65101-9, MBEU65101-10 & MBEU65105-3	Applicable to assemblies which are interchangeable between aircraft.
ENGINE NO. 215101 THRU 215109	Applicable to assemblies which are interchangeable between aircraft, but configurations can not be identified by part number.
CONFIG/IDENT NUMBER 84A	The CONFIG/IDENT Number is the program load identification number which identifies the software program loaded in specific programmable units. Refer to A1-F18AC-SCM-000 for CONFIG/IDENT Number tables.

### 19. TECHNICAL DIRECTIVES.

20. Technical directives are documents which direct the accomplishment, and recording of a retrofit configuration or inspection to delivered aircraft, or aircraft components.

21. **AIRFRAME CHANGE (AFC) AND AIRBORNE TACTICAL SOFTWARE CHANGE (ASC).** Technical directives which change configuration of aircraft structure or equipment installation, i.e. AFC, will list aircraft bureau numbers in effectivity notes and show

before and after the AFC. Technical directives which change configuration of operational flight programs (OFP), i.e. ASC, will list the OFP CONFIG/IDENT NUMBER in effectivity notes and show the latest two authorized OFP programs. See AFC and ASC effectivity examples in Effectivity Note Example Table.

22. **AIRCRAFT COMPONENT CHANGES.** Technical directives which change configuration of aircraft components, i.e. AAC, ACC, AVC, AYC, and PPC will list part numbers in the effectivities. See AVC effectivity examples in Effectivity Note Example table.

**23. RECORD OF APPLICABLE TECHNICAL DIRECTIVES.**

24. The technical directives affecting this manual are listed in the Record of Applicable Directives of each affected work package. Because an ASC directs all aircraft be modified within 30 days, ASC's are not listed. When all affected aircraft are modified, the before configuration is removed from the manual, and the technical directive entry is removed from the Record of Applicable Technical Directives and is entered in the Historical Record of Applicable Technical Directives.

**25. TECHNICAL PUBLICATIONS DEFICIENCY REPORT (TPDR).**

26. The TPDR (OPNAV FORM 4790/66) is the form for reporting errors and suspected omissions in the

technical manuals. Reporting procedures are in OPNAVINST 4790.2 SERIES.

**27. DIAGRAMS.**

28. Simplified schematics and block diagrams are in this manual. System schematics are in A1-F18A( )-( )-500 series manuals.

**29. NAVY (AN) STANDARD/COMMON NAME NOMENCLATURE.**

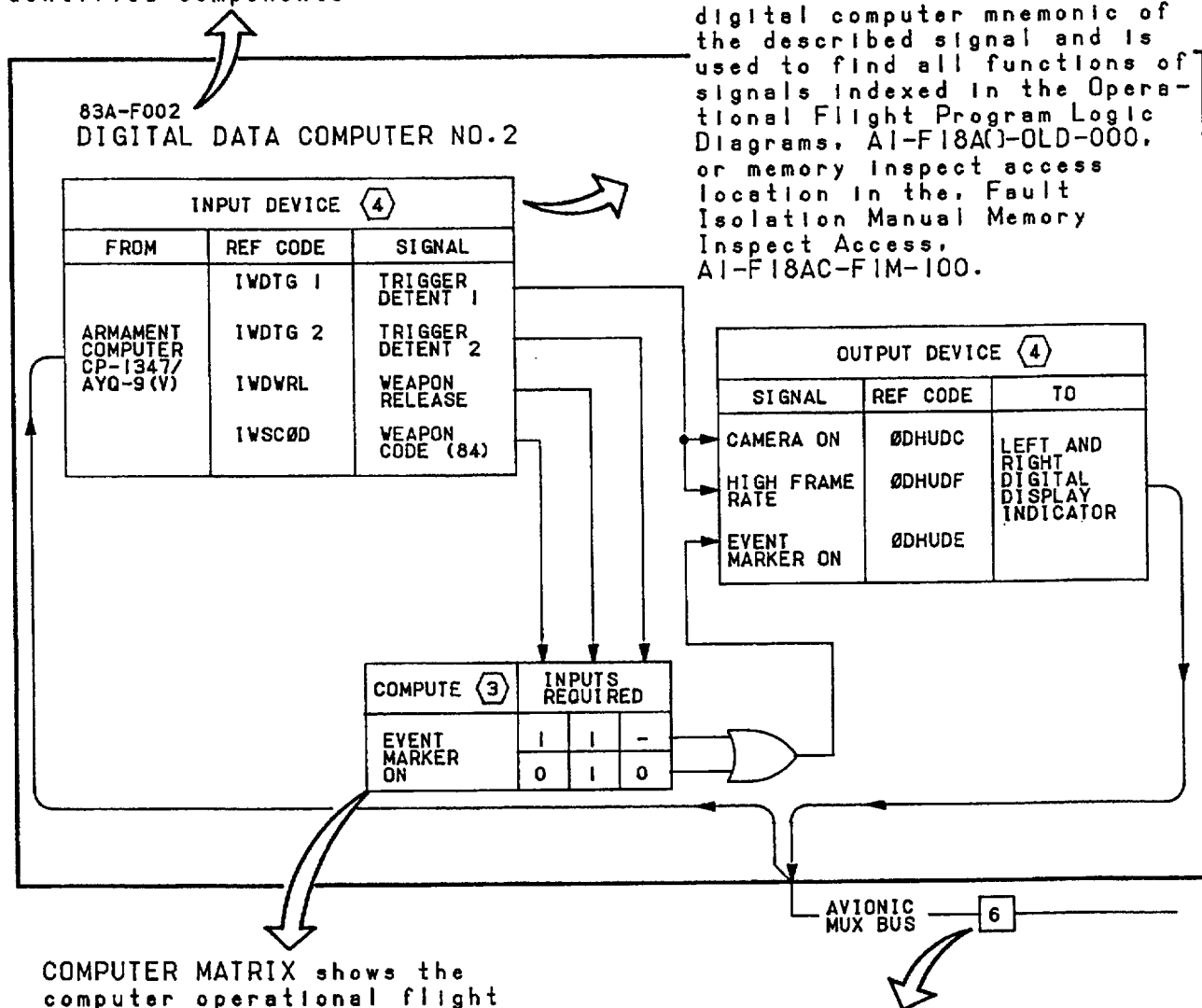
30. When an item has both Navy (AN) standard and common name nomenclature assigned, the common name nomenclature will be used in text and on illustrations. Full Navy (AN) standard nomenclature will be used in the Illustrated Parts Breakdown (IPB).

**Historical Record of Applicable Technical Directives**

None

83A-F002 is the reference designation for Digital Data Computer No.2. Reference designations are used to aid in identifying and locating components. A numerical index of reference designations in the Parts List Index, A1-F18AC-IPB-450, lists all reference designations assigned to electronic, electrical, and mechanical parts of the aircraft. When reference designations are known, the index can be used to find part numbers and to locate specific maintenance instructions for identified components.

INPUT OR OUTPUT DEVICE describes the signal, tells where signal comes from or to what component signal is sent. The REF CODE is the digital computer mnemonic of the described signal and is used to find all functions of signals indexed in the Operational Flight Program Logic Diagrams, A1-F18AC-OLD-000, or memory inspect access location in the, Fault Isolation Manual Memory Inspect Access, A1-F18AC-FIM-100.



COMPUTER MATRIX shows the computer operational flight program in a truth table form. A hexagon symbol is placed in the computer matrix and is a reference to the LEGEND for an explanation of matrix.

SQUARE SYMBOL contains a number that refers to a sheet of the schematic where the circuitry is continued.

Figure 1. Schematic Highlights (Sheet 1)

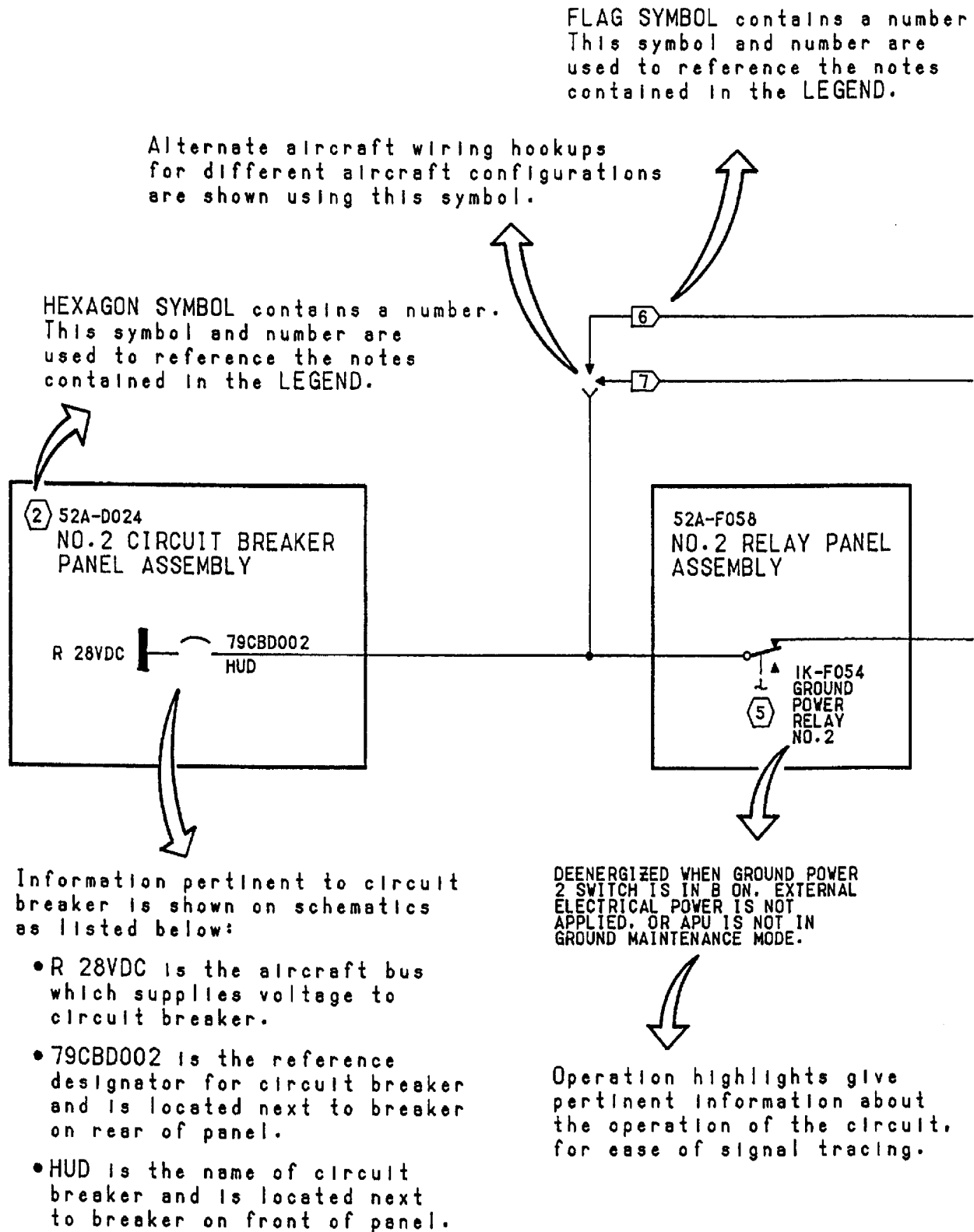


Figure 1. Schematic Highlights (Sheet 2)

The legend contains all notes pertinent to the schematic as listed below:

NUMBER listed with no symbols is general information about the schematic.

NONSTANDARD SYMBOLS appearing on schematic are shown or referenced with an explanation.

ABBREVIATIONS appearing on schematic are shown or referenced with an explanation.

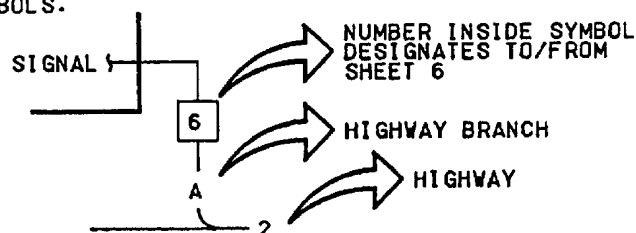
HEXAGON SYMBOL refers to another schematic or manual for continuation of a circuit or an explanation of data contained on schematic.

FLAG SYMBOL indicates limited aircraft application.



## LEGEND

### 1. NONSTANDARD SYMBOLS.



② POWER DISTRIBUTION SYSTEM SIMPLIFIED SCHEMATIC.  
A1-F18AC-420-100. WP005 00.

### ③ EXPLANATION OF MATRIX

- A. COMPUTE COLUMN LISTS THE SIGNAL OUTPUT.
- B. INPUTS REQUIRED ARE USED TO DEVELOP THE SIGNAL OUTPUT.
- C. THE SIGNAL OUTPUT IS READ HORIZONTALLY. EACH HORIZONTAL LINE IS AN INDEPENDENT SIGNAL OUTPUT.
- D. INTERPRET MATRIX TABLE AS INDICATED:
  - (1) ONE (1) INDICATES THIS INPUT AS NAMED MUST BE THERE TO GET THE OUTPUT.
  - (2) ZERO (0) INDICATES THIS INPUT AS NAMED MUST NOT BE THERE TO GET THE OUTPUT.
  - (3) DASH (-) INDICATES THE OUTPUT DOES NOT DEPEND ON THIS INPUT.

④ FOR LOGIC DIAGRAMS RELATING TO REF CODE, REFER TO A1-F18AC-010-000. FOR MEMORY INSPECT ACCESS LOCATION RELATING TO REF CODE, REFER TO A1-F18AC-FIM-100.

⑤ GROUND POWER SWITCHING SIMPLIFIED SCHEMATIC.  
A1-F18AC-420-100. WP005 00.

⑥ F/A-18A.

⑦ F/A-18B.

HIGHLIGHT-(F10-3)-GRID

Figure 1. Schematic Highlights (Sheet 3)



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**ORGANIZATIONAL MAINTENANCE****PRINCIPLES OF OPERATION****DESCRIPTION****FUEL SYSTEM**

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**Reference Material**

Air Data Computer .....	A1-F18AC-560-100
Description .....	WP003 00
Communication, Tacan, ADF, Electronic Altimeter, and IFF Systems .....	A1-F18AC-600-100
Intercommunication and Audio System Description and Operation .....	WP014 00
Electrical System .....	A1-F18AC-420-100
DC Power System .....	WP004 00
Environmental Control Systems .....	A1-F18AC-410-100
Air Cycle Air Condition System .....	WP007 00
Fuel System .....	A1-F18AC-460-100
Fuel Pressurization and Vent System Simplified Schematic .....	WP020 00
Operation .....	WP003 01
Fuel System/Fuel Storage System Component Locator .....	WP003 02
Simplified Schematic .....	WP004 00
Engine Fuel Supply System Description and Operation .....	WP015 00
External Fuel System Description and Operation .....	WP009 00
Fuel Dump System Description and Operation .....	WP017 00
Fuel Pressurization and Vent System Description and Operation .....	WP019 00
Fuel Quantity Gaging System Description and Operation .....	WP021 00
Fuel Quantity Low Level Warning System Description and Operation .....	WP023 00
Hot Fuel Recirculation System Description and Operation .....	WP018 00
Inflight Refueling System Description and Operation .....	WP008 00
Internal Fuel Transfer System Description .....	WP012 00
Internal Fuel Transfer System Simplified Schematic .....	WP014 00
Refuel/Defuel System Description and Operation .....	WP005 00
Hydraulic System .....	A1-F18AC-450-100
Hydraulic System .....	WP003 00
Lighting System .....	A1-F18AC-440-100
Cockpit Interior Lighting System .....	WP004 00
Maintenance Status Display and Recording System .....	A1-F18AC-580-100
Maintenance Status Display and Recording System Operation .....	WP005 00
Mission Computer System .....	A1-F18AC-741-100
System and Component Description .....	WP003 00
Multipurpose Display Group .....	A1-F18AC-745-100
Multipurpose Display Group Description .....	WP003 00
Secondary Power System .....	A1-F18AC-240-100
APU .....	WP005 00
AMAD .....	WP006 00

## Alphabetical Index

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Fuel Cautions and Codes, Table 1 .....	6
Fuel Storage Description .....	3
Fuel System Description .....	2
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System Controls and Indicators .....	5

## Record of Applicable Technical Directives

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 IAFC-056	27 Mar 85	Fuel System Components Replacement and System Inspection (ECP MDA-F/A-18-00158R1 and ECP MDA-F/A-18-00160)	1 Jul 85	-
F/A-18 AFC 53	-	Elimination of Tanks 1 and 4 Sneak Circuit, Tank 4 Motive Flow Shutoff Valve, and Raised Inverted Baffle (ECP MDA-F/A-18-00055/C1)	15 Jun 86	-
F/A-18 AFC 70	-	Installation of Motive Flow Boost Pump Pressure Switch (ECP-MDA-F/A-18-00158R2)	16 Jun 86	-
F/A-18 AFC 39	-	No. 1 Fuel Tank Interconnect Valve Replacement and Fuel Sequencing Modification (ECP MDA-F/A-18-00072C1)	1 Nov 86	-

## 1. DESCRIPTION.

2. **FUEL SYSTEM DESCRIPTION.** Fuel is carried internally in four interconnected fuselage (bladder) tanks and two internal wing (wet) tanks. External fuel is carried in three 315 or 330 gallon tanks. All tanks may be refueled on the ground through a single point refueling receptacle. Airborne, they can be refueled through the inflight refueling probe. The internal wing tanks, tank 1, and tank 4 are transfer tanks. The tanks are arranged so internal fuel gravity transfers (at a reduced rate) even if the transfer jet ejectors fail. Regulated engine bleed air pressure transfers fuel from the external tanks and also provides a positive pressure on all internal fuel tanks. Float type fuel level control valves control fuel level during refueling of all tanks. Fuel level control shutoff valves in tanks 1, 2,

3, and 4 control fuel levels during external fuel transfer. During internal wing transfer fuel level control shutoff valves control fuel levels in tanks 1 and 4. A simplified schematic of the fuel system is in WP004 00.

3. Fuel level sensors are used to control the fuel level in tanks 2 and 3 (engine feed tanks) during fuel transfer from tanks 1 and 4. All internal and external fuel (except engine feed tanks) may be dumped overboard through flame arrester protected outlets in each vertical fin. All internal fuel tanks vent through outlets in the vertical fins. The external tanks are vented overboard through pressure relief valves in the individual external tanks. A fuel quantity indicating system provides fuel quantity indications in pounds.



4. For survivability, the internal fuel tanks are forward of the engines. The internal wing tanks contain explosion suppression foam blocks for fire/explosion protection. The lower section of the feed tanks are self-sealing to provide a “get home” fuel reserve. Fuel lines are routed inside tanks where possible and the fuel feed lines in the MLG wheelwells are wrapped with a protective self-sealing material.

5. The fuel system is divided into the subsystems listed below:

- a. Engine Fuel Supply (WP015 00)
- b. External Fuel (WP009 00)
- c. Fuel Dump (WP017 00)
- d. Fuel Pressurization and Vent (WP019 00)
- e. Fuel Quantity Gaging (WP021 00)
- f. Fuel Quantity Low Level Warning (WP023 00)
- g. Fuel Storage (this WP)
- h. Hot Fuel Recirculation (WP018 00)
- i. Inflight Refueling (WP008 00)
- j. Internal Fuel Transfer (WP012 00)
- k. Refuel/Defuel (WP005 00)

6. **FUEL STORAGE DESCRIPTION.** The fuel storage system is made up of four fuselage tanks, two wing tanks and three external tanks. See tables 2 and 3 for fuel capacities. A component locator in WP003 02 shows fuel storage system components, WP003 01 shows component operation.

7. **Fuselage Fuel Tanks.** All fuselage tanks are bladder type tanks. They are supported in the tank cavity by various brackets, fittings, and nylon lacing cords.

8. **Feed Tanks.** The internal transfer system is designed to keep fuel in the feed tanks, tanks 2 and 3, at all engine power settings. Transfer fuel from tanks 1 and 4, flows to the feed tanks where the fuel level is maintained by fuel level sensors WP012 00).

9. On 161353 THRU 161715 BEFORE F/A-18 AFC 53, tanks 2 and 3 are internally divided by horizontal inverted flight baffles. Each baffle assembly has four flapper check valves that set under the baffle webs. The check valves are normally open to allow fuel flow from top to bottom of the fuel tank. During negative G or inverted flight, the flapper check valves swing closed retaining fuel in the area of the jet ejector.

10. On 161716 AND UP ALSO 161353 THRU 161715 AFTER F/A-18 AFC 53, tanks 2 and 3 are internally divided by horizontal inverted flight baffles that have raised center sections. The volume under each baffle is increased by 50 percent to make more fuel available during negative G and inverted flight. The raised baffles have flapper check valves that are normally open to allow fuel flow from top to bottom of tank. During negative G or inverted flight the flappers swing closed retaining fuel in the area of the engine fuel turbine boost pump or engine fuel boost jet ejector.

11. The lower areas of tanks 2 and 3 are self-sealing. If a self-sealing area of a tank is damaged, the thick inner layer of natural gum rubber activates when it contacts fuel and forms a seal. These self-sealing areas of tanks 2 and 3, give the aircraft a “get home” fuel reserve.

12. **Backing Boards.** Fiber glass backing boards are installed between the self-sealing area of tanks 2 and 3 and the tank cavity. Backing boards keep sharp edges on the cavity, caused by battle damage, from contacting the self-sealing fuel tank.

13. **Wing Tanks.** Wing tanks transfer fuel to tanks 1 and 4, and are an integral part of the wing structure. Wing tanks are sealed by filling channels with sealant which is injected through fittings on the outside of the wings. Explosion suppression foam blocks are used in every part of the wing tank, to prevent an explosive atmosphere in case of battle damage.

14. **Vent Tanks.** The vent tanks collect fuel as a result of thermal expansion or internal spillage from the wing and fuselage fuel tanks. The vent tank in the aft fuselage is a bladder type tank and has a capacity of 18 gallons. The left and right vertical stabilizer vent tanks are an integral part of each vertical stabilizer. Each tank has a capacity of approximately 17 gallons and is sealed by filling channels with sealant through fittings on the outside of each stabilizer.

15. Fuel that collects in the vertical stabilizer vent tanks gravity flows into the fuselage vent tank. The fuselage vent tank is scavenged by two vent tank scavenge jet ejectors which are powered by boost pump motive flow fuel pressure (WP014 00). The ejectors can empty full vent tanks within 3 minutes after engines or APU are started preventing fuel from dumping out of the vent masts (WP020 00) during launch.

16. **Fuel Tank Cavity Vent and Drain.** The space between each bladder type tank and tank cavity is vented and drained through scarfed tubes that extend outside the lower fuselage. During a rapid climb, air in the cavity expands and is vented overboard. During a rapid descent, air inflow pressurizes voids in the tank cavity preventing stretching of the tank.

17. **COMPONENT DESCRIPTION.** Fuel system components are described in the applicable work packages listed below:

- a. Engine Fuel Supply (WP015 00)
- b. External Fuel (WP009 00)
- c. Fuel Dump (WP017 00)
- d. Fuel Pressurization and Vent (WP019 00)
- e. Fuel Quantity Gaging (WP021 00)
- f. Fuel Quantity Low Level Warning (WP023 00)
- g. Hot Fuel Recirculation (WP018 00)
- h. Inflight Refueling (WP008 00)
- i. Internal Fuel Transfer (WP012 00)
- j. Refuel/Defuel (WP005 00)

18. **RELATED SYSTEMS.** Systems related to the fuel system are listed below.

19. **Air Data Computer CP-1334A (ADC).** The Air Data Computer (ADC) supplies a ground signal for control of the internal fuel tank air pressure regulator (WP003 01) no. 2 solenoid. The ADC also controls:

a. On 161925 AND UP; ALSO 161520 THRU 161761 AFTER F/A-18 AFC 53, the ADC stops fuel transfer from tanks 1 and 4 during negative G conditions above feed tank low level warning (800  $\pm$ 100 pounds) (A1-F18AC-560-100, WP003 00).

b. On 161353 THRU 161519 AFTER F/A-18 AFC 53, the ADC stops fuel transfer from tank 4 during negative G conditions above feed tank low level warning (800  $\pm$ 100 pounds) (A1-F18AC-560-100, WP003 00).

c. On 161520 THRU 161761 BEFORE F/A-18 AFC 53, the ADC stops fuel transfer from tank 1 during a negative G condition above feed tank low level warning (800  $\pm$ 100 pounds) (A1-F18AC-560-100, WP003 00).

20. **Electrical System.** The electrical system supplies utility battery power or 28vdc and 115vac bus power for electrical operation of fuel system components (A1-F18AC-420-100, WP003 00, WP004 00).

21. **Environment Control System.** The air cycle air conditioning system (A1-F18AC-410-100, WP007 00) supplies engine bleed air to the fuel pressurization and vent system. The primary heat exchanger provides air pressure to the internal and external tanks air pressure regulators for fuel system pressurization.

22. **Hydraulic System.** Hydraulic system 2, circuit A pressure extends and retracts the inflight refueling probe during normal operation. System 2B pressure is used to emergency extend the probe.

23. Hydraulic fluid is cooled through the hydraulic oil/fuel heat exchangers before entering the reservoirs. System 1 hydraulic fluid is cooled in the left heat exchanger and system 2 hydraulic fluid is cooled in the right heat exchanger (A1-F18AC-450-100, WP003 00).

24. **Lighting System.** The fuel system panels and inflight refueling floodlight are part of the primary lighting system (A1-F18AC-440-100, WP004 00).

25. **Maintenance Status Display And Recording System (MSDRS).** The maintenance status display and recording system receives inputs from the fuel system through the Signal Data Converter CV-3493/ASM-612 and Signal Data Recorder RO-508/ASM-612. The MSDRS Signal Data Recorder sends data to the mission computer system for processing. If the mission computer system detects a fuel system failure, it sends the

applicable maintenance code to the MSDRS Signal Data Recorder CV-3493/ASM-612 which sends it to the nose wheelwell Digital Display Indicator ID-2150/ASM-612 for storage and display (A1-F18AC-580-100, WP005 00).

**26. Mission Computer System.** The mission computer system receives fuel system data from the MSDRS. The mission computer system digital data computer no. 1 processes the data to determine when a fuel system failure or caution condition occurs. If a failure occurs, the mission computer system sends the applicable maintenance code to the MSDRS for storage and display. If a caution condition occurs, digital data computer no. 1 sends the caution message to the multipurpose display group for display and, if applicable, to the intercommunication and audio system for voice alert. The mission computer system Control Converter C-10382/A lights the MASTER CAUTION light on LH advisory and threat warning indicator panel when a caution condition occurs (A1-F18AC-741-100, WP003 00).

**27. Multipurpose Display Group.** If the mission computer system detects a fuel system caution condition, it sends the caution message to the multipurpose display group. The left Digital Display Indicator IP-1317( ) and on F/A-18B, the rear left Digital Display Indicator IP-1318( ) receive and display the caution messages (A1-F18AC-745-100, WP003 00).

**28. Intercommunication and Audio System.** The intercommunication and audio system alert the pilot via the head set. An audible “bingo” or “fuel low” alerts the pilot when a caution occurs. The voice alert is not repeated unless the requirement for the voice alert is absent for 5 seconds or more and the caution condition occurs again (A1-F18AC-600-100, WP014 00).

**29. Secondary Power Supply.** The fuel system motive flow/boost pump is mounted on and driven by airframe mounted accessory drive (AMAD) unit. During normal operation, the engine powers the AMAD.

**30.** Fuel from the hot fuel recirculation system is used by the fuel/oil heat exchanger to cool AMAD lube oil (A1-F18AC-240-100, WP006 00).

**31.** The auxiliary power unit (APU) can be used during fuel system testing, if required. The APU is supplied fuel from the left engine feed line through the

APU fuel shutoff valve and fuel control solenoid shutoff valve (A1-F18AC-240-100, WP005 00).

**32. SYSTEM CONTROLS AND INDICATORS.** The fuel system controls and indicators are listed below. Controls and indicators are illustrated in WP003 02.

**33. FUEL QTY (Fuel Quantity) Indicator.** The FUEL QTY indicator INT pointer continuously displays internal fuel in pounds. The TOTAL LBS counter displays internal and external fuel. The FUEL QTY indicator controls are listed below:

- a. Bingo set selector/bug
- b. FUEL QTY selector

**34. Bingo Set Selector/Bug.** The bingo set selector is used to select bingo fuel quantity. Turning the set selector moves the bug across the INT pounds scale. When internal fuel quantity reaches the bug, BINGO is displayed on the cockpit left Digital Display Indicator IP-1317( ) and the “Bingo” voice alert cautions the pilot about his fuel state. Bingo fuel quantity may also be used to stop fuel dump at any desired level above low level warning ( $800 \pm 100$  lbs in either feed tank) or to warn when a certain level is reached during inflight refueling.

**35. FUEL QTY Selector.** The selector provides positions listed below:

- a. BIT (Built-in Test) - spring loaded position that tests the operating condition of the fuel level gaging, low level warning and CG control systems.

- b. FEED - fuel remaining in feed tanks 2 and 3 is displayed.

- c. TRANS - fuel remaining in transfer tanks 1 and 4 is displayed.

- d. INTR WING - fuel remaining in the internal wings is displayed.

- e. EXT WING - fuel remaining in wing external tanks is displayed.

- f. EXT CTR - fuel remaining in centerline external tank is displayed.

**36. Fuel Quantity Repeater Indicator - F/A-18B.** The repeater indicator continuously displays internal fuel on the INTERNAL LBS counter and

internal and external fuel on the TOTAL LBS counter.

37. **Caution Lighting.** The yellow CAUTION lights indicate a fuel system caution/advisory requiring attention but not immediate action. Fuel system cautions/advisories are displayed on left DDI or caution light indicator panel. Caution lights are listed below:

a. LH advisory and threat warning indicator panel

(1) MASTER CAUTION light

b. Caution light indicator panel

(1) FUEL LO light

38. **Digital Display Indicator IP-1317( ), IP-1318( ).** Caution displays will appear on left Digital Display Indicator IP-1317( ) in the cockpit and on F/A-18B, left Digital Display Indicator IP-1318( ) in the rear cockpit. Caution displays which appear for a fuel system malfunction are listed in table 1.

39. **Digital Display Indicator ID-2150/ASM-612.** The Digital Display Indicator ID-2150/ASM-612 in the nose wheelwell stores and displays fuel system maintenance failure codes. See table 1 for list of fuel maintenance failure codes.

**Table 1. Fuel Cautions and Codes**

Caution Display	Maintenance Failure Codes
BINGO	-
L BOOST LO	942 - Right Fuel Shut-off Valve Closed (WP015 00)
R BOOST LO	943 - Left Fuel Shutoff Valve Closed (WP015 00)
-	3 944 - Left and Right Fuel Boost Low with crossfeed valve closed (WP015 00)

**Table 1. Fuel Cautions and Codes (Continued)**

Caution Display	Maintenance Failure Codes
	3 944 - Left and Right Fuel Boost High with crossfeed valve open (WP015 00)
	3 944 - Left and Right Shutoff Valves closed with crossfeed valve open (WP015 00)
	4 944 - Will always be displayed, indicating cross-feed valve open, when code 944 is not displayed, the crossfeed valve is failed closed (WP015 00)
	945 - Tank 3 Failure (WP012 00) 946 - Tank 2 Failure (WP012 00) 947 - Tank 4 Failure (WP012 00) 948 - Tank 1 Failure (WP012 00)
1 CG	-
DUMP OPEN	941 - Fuel Dump Open when commanded closed (WP017 00)
EXT TANK	951 - External Tank Overpressure (WP009 00)
FUEL LO	-
L FUEL HOT	658 - Left Fuel Temperature Signal Fail (WP018 00)
R FUEL HOT	674 - Right Fuel Temperature Signal Fail (WP018 00)
2 FUEL	-

**Table 1. Fuel Cautions and Codes  
(Continued)**

Caution Display	Maintenance Failure Codes
PROBE UNLK	-
TANK PRESS	-
<div>1</div> 161520 AND UP	
<div>2</div> Advisory that indicates the BIT for Fuel Lo, Bingo, or CG caution has failed	
<div>3</div> 163119 AND UP, 161353 THRU 161924 BEFORE F/A-18 IAFC 056, ALSO 161353 THRU 163118 AFTER F/A-18 AFC 70.	
<div>4</div> 161353 THRU 161924 AFTER F/A-18 IAFC 056, ALSO 161353 THRU 163118 BEFORE F/A-18 AFC 70.	

40. **Fuel Check Panel.** The Fuel Check Panel in door 8, is used to select readings of internal and external fuel tanks during ground operations. The switches and indicators are listed below:

a. On 161353 THRU 161761 BEFORE F/A-18 AFC 39;

TK INTCON V CHK switch  
L EXT FTK CHK switch  
R EXT FTK CHK switch  
C EXT FTK CHK switch  
TK 3V POS indicator light  
TK 2V POS indicator light

b. On 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39;

TK INTCON V CHK switch  
TK 1V POS indicator light  
TK 2V POS indicator light  
TK 3V POS indicator light  
EXT TK PRCHK SW

41. TK INTCON V CHK Switch - 161353 THRU 161761 BEFORE F/A-18 AFC 39. The TK INTCON V CHK switch is used to verify that the flappers of tank 2 and tank 3 pressure operated interconnect valves are closed. On 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39, the TK INTCON V CHK switch is used to verify

that the flappers of tank 1, tank 2 and tank 3 pressure operated interconnect valves are closed (WP003 01).

42. TK 2V/TK 3V POS Indicator Lights. When the TK INTCON V CHK switch is set, the TK 2V/TK 3V POS indicator light shows green if applicable flapper on interconnect valve is closed (WP003 01).

43. TK 1V POS Indicator Light - 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39. When the TK INTCON V CHK switch is set, the TK 1V/POS indicator light shows green if flapper of interconnect valve is closed (WP003 01).

44. L/R/C EXT FTK CHK Switch - 161353 THRU 161761 BEFORE F/A-18 AFC 39. During ground refueling with electrical power, the L/R/C EXT FTK CHK switches individually prechecks each external tank at the shutoff valves (WP003 01).

45. EXT TK PRCHK SW - 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39. During ground refueling with electrical power, the EXT TK PRCHK SW simultaneously prechecks all external tanks at the shutoff valves (WP003 01).

46. Exterior Lights (EXT LT) Control Panel.

The INTR WING switch is located on the EXT LT control panel. When this switch is set to INHIBIT, the below occurs:

a. Wing damage shutoff valve is energized closed, stopping wing transfer.

b. Wing refuel lockout valve energizes open to prevent wing refueling.

c. Wing diverter valves deenergize and direct fuel to the feed tanks.

47. **FUEL System Control Panel.** The FUEL system control panel contains the switches listed below:

a. EXT TANKS - WING switch

b. EXT TANKS - CTR switch

c. PROBE control switch

d. DUMP switch

48. EXT TANKS Switches. External tanks can be pressurized with aircraft on the ground by setting the EXT TANKS - WING/CTR switch to OVER-RIDE. When the switches are set to STOP, the fuel tanks will stop refuel/transfer. When feed tanks deplete below  $800 \pm 100$  LB, transfer will resume automatically.

49. PROBE Control Switch. The PROBE switch is normally set to RETRACT. When the switch is set to EXTEND or EMERGENCY EXTEND, the inflight refueling probe extends and the internal fuel tank air pressure regulator is deenergized closed and the external tanks air pressure regulator is energized closed. The regulators are closed to prevent tanks from being pressurized during refueling.

50. DUMP Switch. When the magnetically held DUMP switch is set to ON with weight-off-wheels, the motor driven dump valve in tank 4 opens and fuel dumps. DUMP switch will automatically shut OFF when fuel quantity reaches low level warning point ( $800 \pm 100$  lb) or BINGO fuel setting.

51. **Tank Pressure/Fuel Flow Indicator.** The tank pressure indicator will display fuel overpressurization in the fuselage and wing tanks during refueling causing pressure indicator to display red and show the word STOP. The fuel flow indicator displays fuel flow (7 to 13 gpm or more) through the fuel system during refuel/defuel (WP003 01).

## F/A-18A

FUEL TANK	U.S. GALLONS	IMPERIAL GALLONS	LITERS	POUNDS JP-4	POUNDS JP-5	POUNDS JP-8
NO. 1	418	348	1,582	2,720	2,840	2,800
NO. 2	263	219	995	1,710	1,790	1,760
NO. 3	206	171	780	1,340	1,400	1,380
NO. 4	532	443	2,014	3,460	3,620	3,560
LEFT WING	85	71	322	550	580	570
RIGHT WING	85	71	322	550	580	570
<b>TOTAL INTERNAL FUEL</b>	<b>1,589</b>	<b>1,323</b>	<b>6,014</b>	<b>10,330</b>	<b>10,810</b>	<b>10,650</b>
<b>EXTERNAL TANKS</b>						
ELLIPTICAL TANK	315	262	1,192	2,050	2,140	2,110
CYLINDRICAL TANK	330	275	1,249	2,150	2,240	2,210
<b>TOTAL INTERNAL FUEL PLUS ELLIPTICAL EXTERNAL TANK(S)</b>						
1 ELLIPTICAL TANK	1,904	1,585	7,207	12,380	12,950	12,760
2 ELLIPTICAL TANKS	2,219	1,848	8,399	14,420	15,090	14,870
3 ELLIPTICAL TANKS	2,534	2,110	9,591	16,470	17,230	16,980
<b>TOTAL INTERNAL FUEL PLUS CYLINDRICAL EXTERNAL TANK(S)</b>						
1 CYLINDRICAL TANK	1,919	1,598	7,263	12,470	13,050	12,860
2 CYLINDRICAL TANKS	2,249	1,873	8,512	14,620	15,290	15,070
3 CYLINDRICAL TANKS	2,579	2,148	9,762	16,760	17,540	17,280
<b>NOTES</b> <ul style="list-style-type: none"> <li>THIS TABLE IS FOR INFORMATIONAL PURPOSES ONLY, FUEL WEIGHTS ARE BASED ON MIL-T-5624 FUEL AT 6.5 POUNDS PER GALLON FOR JP-4 AND 6.8 POUNDS PER GALLON FOR JP-5 AND MIL-T-83133 FUEL AT 6.7 POUNDS PER GALLON FOR JP-8 AT A TEMPERATURE OF 15°C (60°F). IF MORE DETAILED INFORMATION IS NEEDED ON FUEL DENSITY/FUEL QUANTITY, SEE REFUELING PROCEDURES IN A1-F18AC-PCM-000.</li> <li>IMPERIAL GALLONS AND LITERS ARE ROUNDED OFF TO THE NEAREST WHOLE NUMBER. POUNDS JP-4, JP-5, AND JP-8 ARE ROUNDED OFF TO THE NEAREST 10 LBS.</li> </ul>						

Figure 1. Fuel Capacities (Sheet 1)

## F/A-18B

FUEL TANK	U.S. GALLONS	IMPERIAL GALLONS	LITERS	POUNDS JP-4	POUNDS JP-5	POUNDS JP-8
NO. 1	316	263	1,196	2,050	2,150	2,120
NO. 2	263	219	995	1,710	1,790	1,760
NO. 3	206	171	780	1,340	1,400	1,380
NO. 4	532	443	2,014	3,460	3,620	3,560
LEFT WING	85	71	322	550	580	570
RIGHT WING	85	71	322	550	580	570
<b>TOTAL INTERNAL FUEL</b>	<b>1,487</b>	<b>1,238</b>	<b>5,628</b>	<b>9,670</b>	<b>10,110</b>	<b>9,960</b>
<b>EXTERNAL TANKS</b>						
ELLIPTICAL TANK	315	262	1,192	2,050	2,140	2,110
CYLINDRICAL TANK	330	275	1,249	2,150	2,240	2,210
<b>TOTAL INTERNAL FUEL PLUS ELLIPTICAL EXTERNAL TANK(S)</b>						
1 ELLIPTICAL TANK	1,802	1,501	6,821	11,710	12,250	12,070
2 ELLIPTICAL TANKS	2,117	1,763	8,013	13,760	14,400	14,180
3 ELLIPTICAL TANKS	2,432	2,025	9,205	15,810	16,540	16,290
<b>TOTAL INTERNAL FUEL PLUS CYLINDRICAL EXTERNAL TANK(S)</b>						
1 CYLINDRICAL TANK	1,817	1,513	6,877	11,810	12,360	12,170
2 CYLINDRICAL TANKS	2,147	1,788	8,126	13,960	14,600	14,380
3 CYLINDRICAL TANKS	2,477	2,063	9,375	16,100	16,840	16,600
<b>NOTES</b> <ul style="list-style-type: none"> <li>THIS TABLE IS FOR INFORMATIONAL PURPOSES ONLY. FUEL WEIGHTS ARE BASED ON MIL-T-5624 FUEL AT 6.5 POUNDS PER GALLON FOR JP-4 AND 6.8 POUNDS PER GALLON FOR JP-5 AND MIL-T-83133 FUEL AT 6.7 POUNDS PER GALLON FOR JP-8 AT A TEMPERATURE OF 15°C (60°F). IF MORE DETAILED INFORMATION IS NEEDED ON FUEL DENSITY/FUEL QUANTITY, SEE REFUELING PROCEDURES IN A1-F18AC-PCM-000.</li> <li>IMPERIAL GALLONS AND LITERS ARE ROUNDED OFF TO THE NEAREST WHOLE NUMBER. POUNDS JP-4, JP-5, AND JP-8 ARE ROUNDED OFF TO THE NEAREST 10 LBS.</li> </ul>						

Figure 1. Fuel Capacities (Sheet 2)



## ORGANIZATIONAL MAINTENANCE

## PRINCIPLES OF OPERATION

## OPERATION

## FUEL SYSTEM

## Reference Material

Fuel System .....	A1-F18AC-460-100
Engine Fuel Supply System Description and Operation .....	WP015 00
External Fuel System Description and Operation .....	WP009 00
Fuel Dump System Description and Operation .....	WP017 00
Fuel Pressurization and Vent System Description and Operation .....	WP019 00
Fuel Quantity Gaging System Description and Operation .....	WP021 00
Fuel Quantity Low Level Warning System Description and Operation .....	WP023 00
Fuel System Description .....	WP003 00
Hot Fuel Recirculation System Description and Operation .....	WP018 00
Inflight Refueling System Description and Operation .....	WP008 00
Internal Fuel Transfer System Description .....	WP012 00
Refuel/Defuel System Description and Operation .....	WP005 00

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Component Operation .....	2
Fuel System Component Operation, Figure 1 .....	4
System Operation .....	3

## Record of Applicable Technical Directives

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 AFC 53	-	Elimination of Tanks 1 and 4 Sneak Circuit, Tank 4 Motive Flow Shutoff Valve, and Raised Inverted Baffle (ECP MDA-F/A-18-00055/C1)	15 Jun 86	-
F/A-18 AFC 18	-	Incorporation of Fuel Turbine Boost Pump/ Sealing of Raised Baffle in Fuel Tanks 2 and 3 (ECP MDA-F/A-18-00077C1/C2)	15 Jun 86	-
F/A-18 AFC 39	-	No. 1 Fuel Tank Interconnect Valve Re- placement and Fuel Sequencing Modification (ECP MDA-F/A-18-00072C1)	1 Nov 86	-

1. **COMPONENT OPERATION.**

2. The operation of fuel system components listed below are shown in figure 1.

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### 3. SYSTEM OPERATION.

4. Fuel System is divided into the subsystems listed below:

- |  |   |
|--|---|
| a. Engine Fuel Supply (WP015 00)           | e. Fuel Quantity Gaging (WP021 00)            |
| b. External Fuel (WP009 00)                | f. Fuel Quantity Low Level Warning (WP023 00) |
| c. Fuel Dump (WP017 00)                    | g. Fuel Storage (WP003 00)                    |
| d. Fuel Pressurization and Vent (WP019 00) | h. Hot Fuel Recirculation (WP018 00)          |
|  | i. Inflight Refueling (WP008 00)              |
|  | j. Internal Fuel Transfer (WP012 00)          |
|  | k. Refuel/Defuel (WP005 00)                   |

## TANK PRESSURE/FUEL FLOW INDICATOR AND FUEL FLOW SENSOR

NORMAL PRESSURE OF FUSELAGE AND WING TANK IS DISPLAYED AT THE PRESSURE INDICATOR AS GREEN. NUMBERS ON THE FACE OF THE INDICATOR REFERENCE FUSELAGE PRESSURE IN POUNDS PER SQUARE INCH (PSI). IF THE TANK IS OVERPRESSURIZED DURING REFUELING, TANK PRESSURE FROM NO. 1 FUEL TANK ACTUATES THE DIAPHRAGM AND SPLINED RACK. THE RACK ROTATES THREE GEARS CAUSING THE PRESSURE INDICATOR TO DISPLAY RED AND SHOW THE WORD STOP. THE FLOW SENSOR IS MOUNTED IN THE REFUEL/DEFUEL MANIFOLD. AT 7 TO 13 GPM THE FLOW SENSOR FLAPPER ROTATES AWAY FROM THE PRESSURE PORT CAUSING THE FUEL FLOW INDICATOR TURBINE TO ROTATE. WHEN REFUELING STOPS, SPRING PRESSURE RETURNS THE FLAPPER AND CLOSSES OVER THE PRESSURE PORT STOPPING TURBINE ROTATION AT LESS THAN 7 GPM.

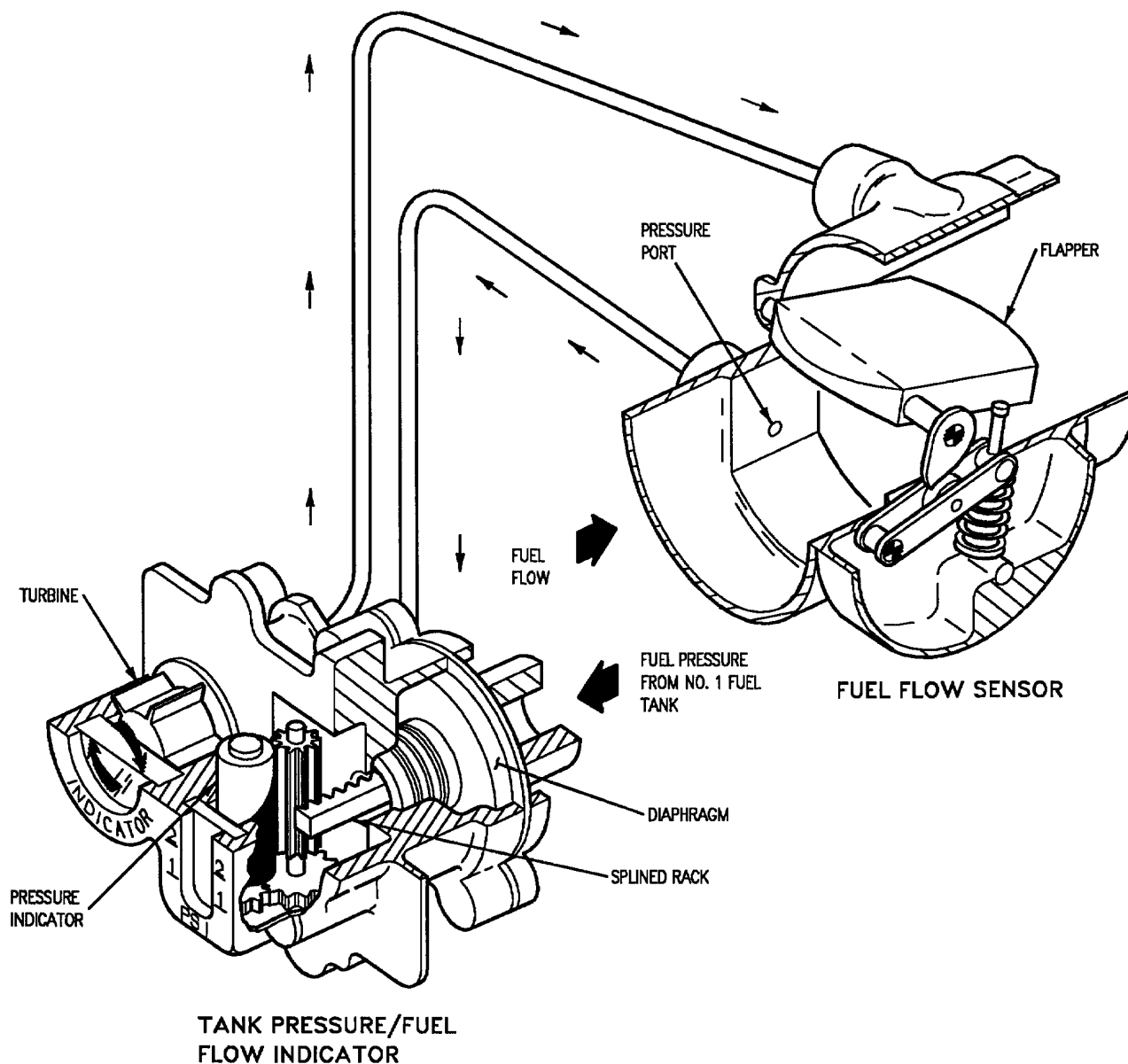
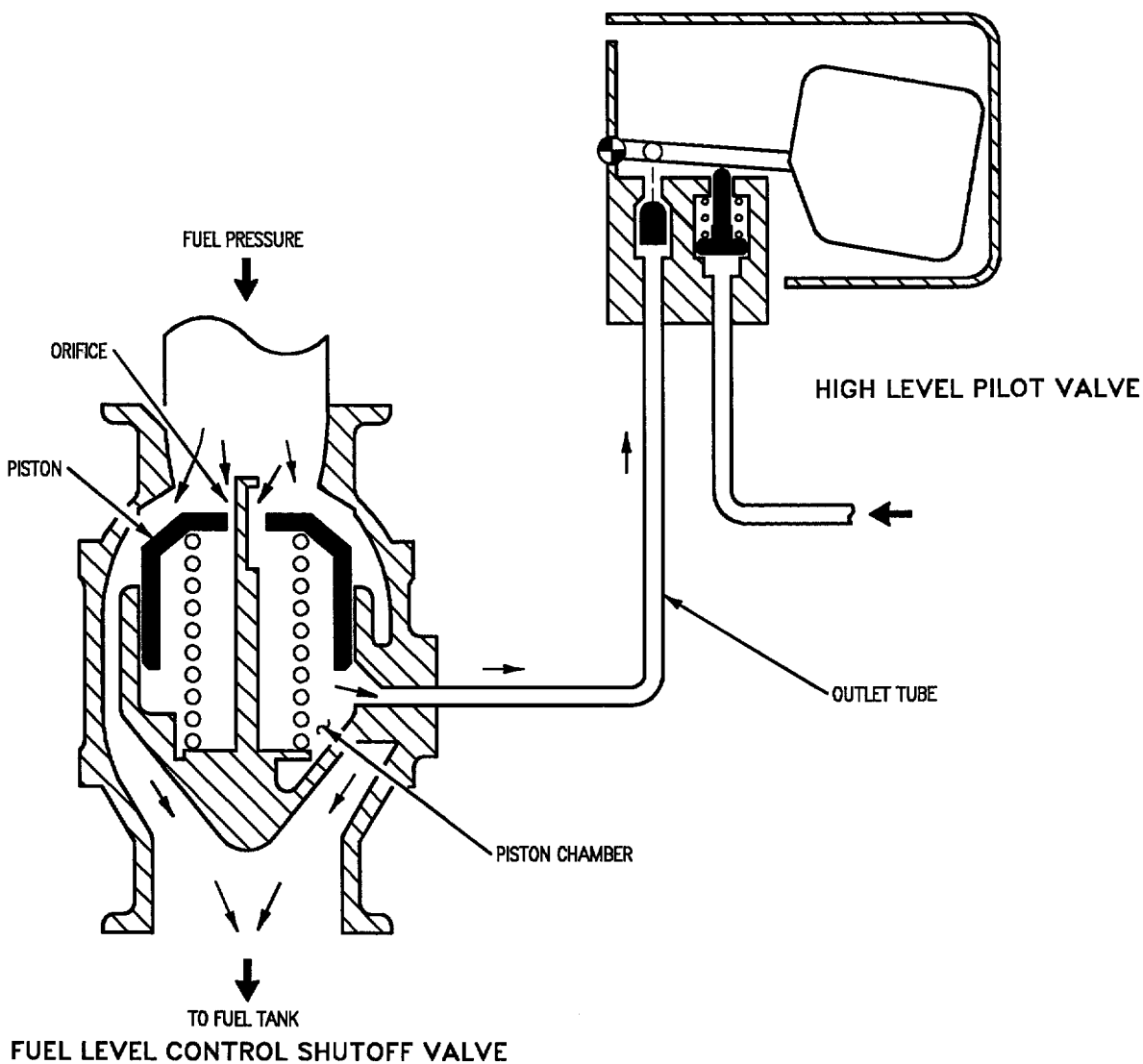


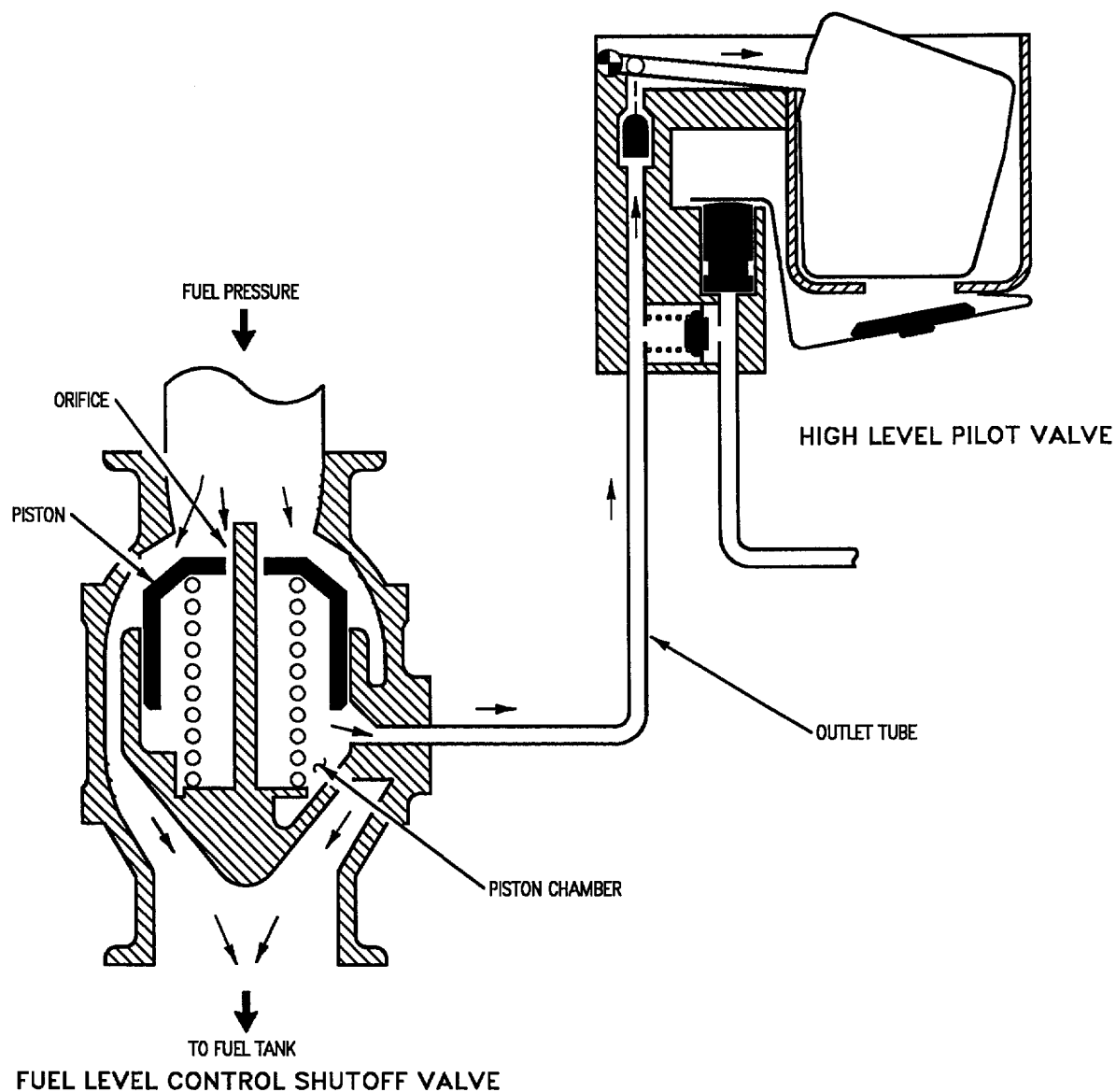
Figure 1. Fuel System Component Operation (Sheet 1)

FUEL LEVEL CONTROL SHUTOFF VALVE AND HIGH LEVEL PILOT VALVE  
(2800095)

## REFUELING

WHEN FUEL LEVEL IS BELOW THE HIGH LEVEL PILOT VALVE, REFUEL PRESSURE APPLIED TO THE PISTON CAUSES FUEL IN PISTON CHAMBER TO RELIEVE THROUGH THE OUTLET TUBE. AS FUEL AMOUNT IN PISTON CHAMBER DECREASES, THE PISTON OPENS ALLOWING THE FUEL TANK TO FILL.

Figure 1. Fuel System Component Operation (Sheet 2)

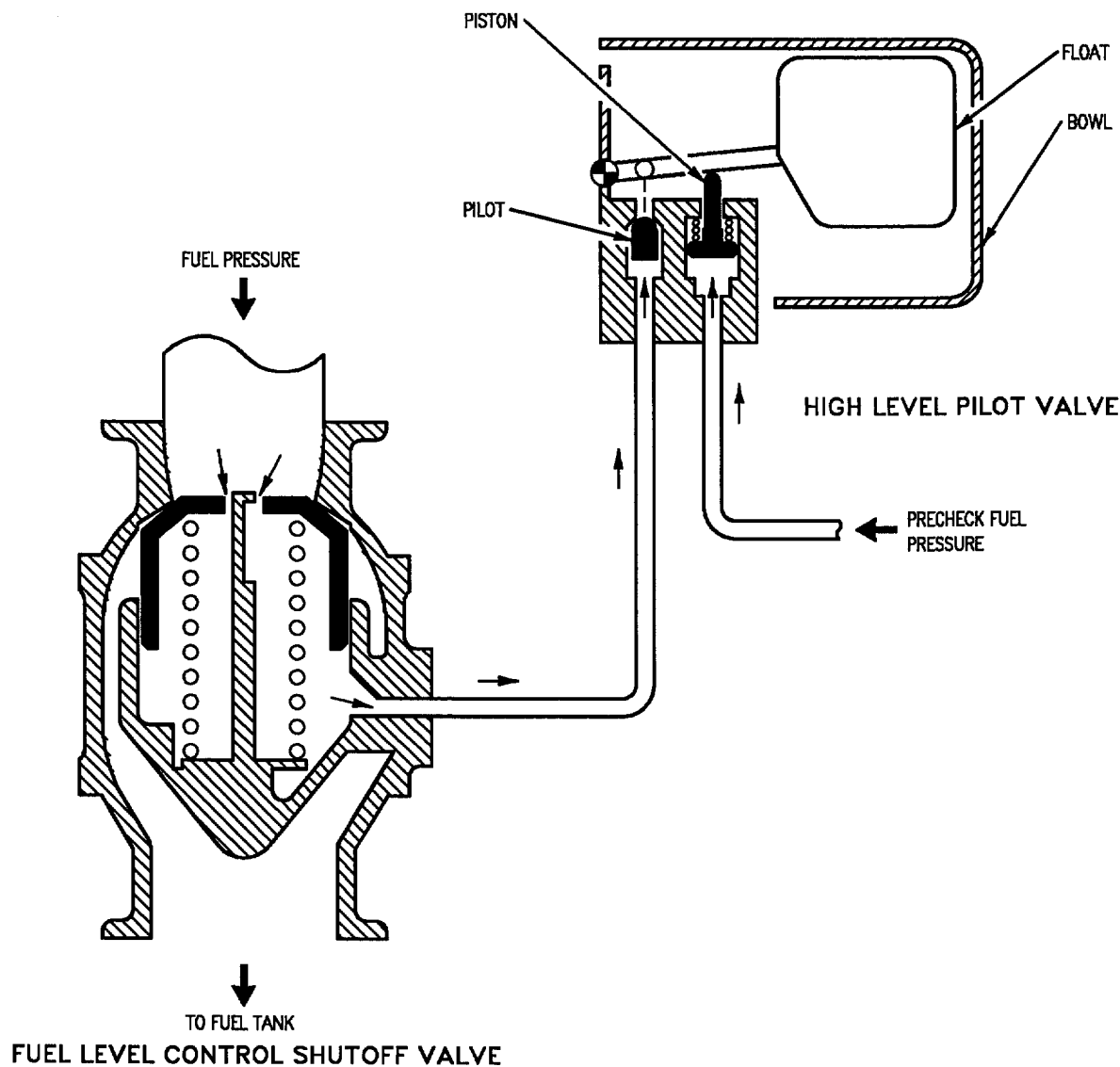
FUEL LEVEL CONTROL SHUTOFF VALVE AND HIGH LEVEL PILOT VALVE  
(2800018)

## REFUELING

WHEN FUEL LEVEL IS BELOW THE HIGH LEVEL PILOT VALVE, REFUEL PRESSURE APPLIED TO THE PISTON CAUSES FUEL IN PISTON CHAMBER TO RELIEVE THROUGH THE OUTLET TUBE. AS FUEL AMOUNT IN PISTON CHAMBER DECREASES, THE PISTON OPENS ALLOWING THE FUEL TANK TO FILL.

Figure 1. Fuel System Component Operation (Sheet 3)

FUEL LEVEL CONTROL SHUTOFF VALVE AND HIGH LEVEL PILOT VALVE  
(2800095)

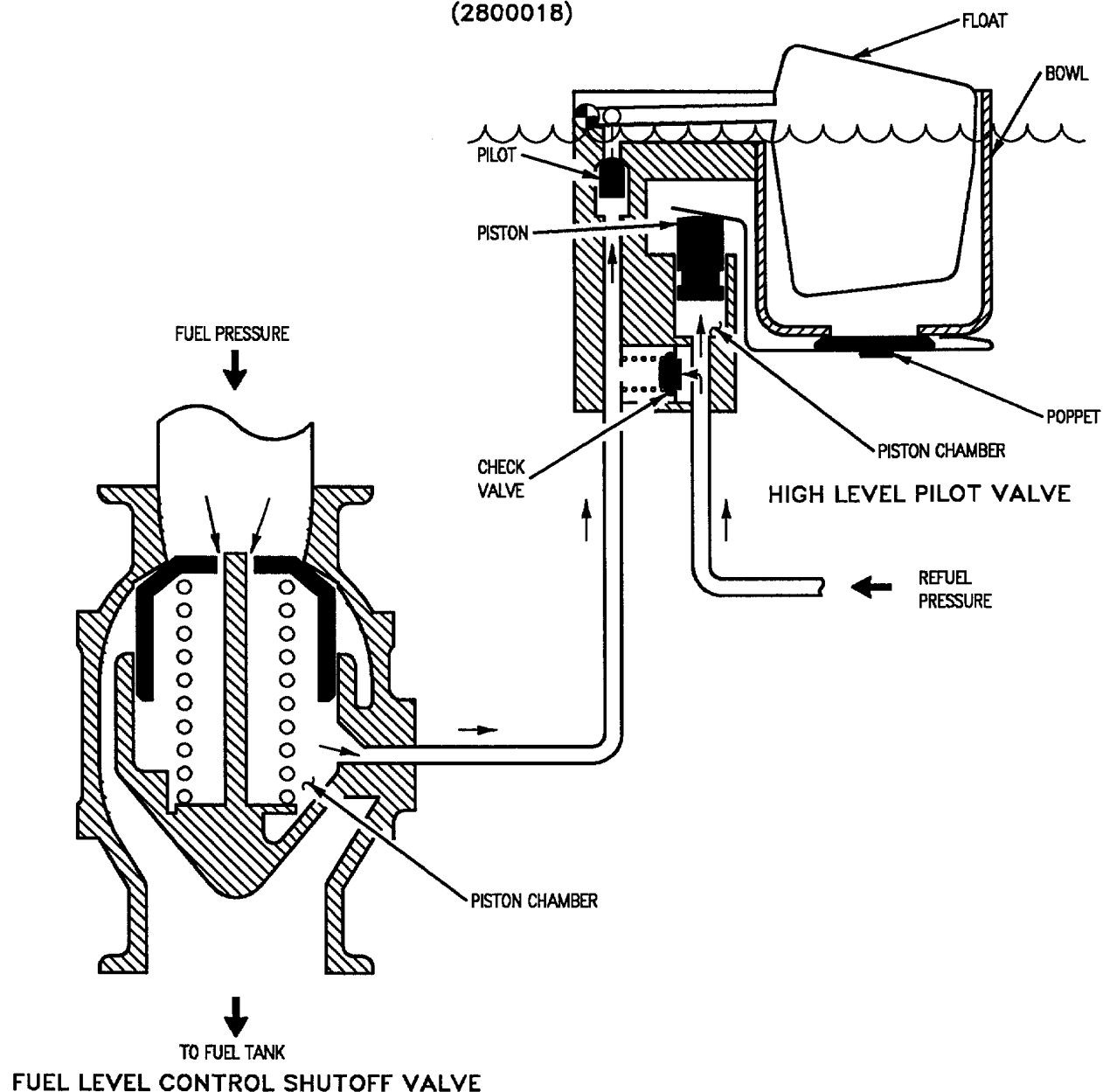


**PRECHECK**

DURING PRECHECK, REFUEL PRESSURE IS APPLIED TO THE PISTON, RAISING THE FLOAT. AS THE FLOAT RISES, THE PILOT CLOSSES AND CAUSES THE SHUTOFF VALVE TO CLOSE.

Figure 1. Fuel System Component Operation (Sheet 4)

# FUEL LEVEL CONTROL SHUTOFF VALVE AND HIGH LEVEL PILOT VALVE (2800018)



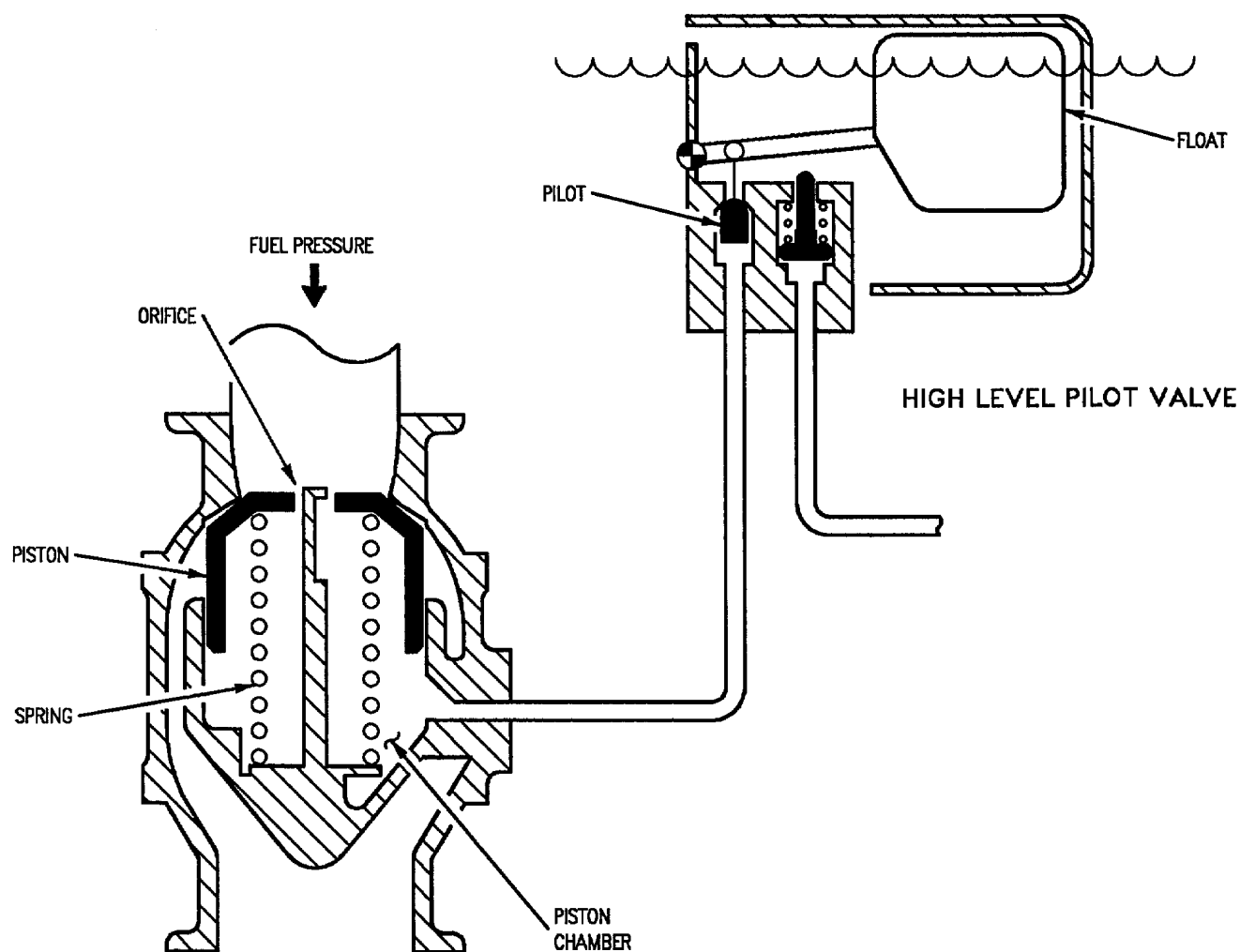
## PRECHECK

DURING PRECHECK, REFUEL PRESSURE IS ROUTED TO THE PILOT VALVE PISTON CHAMBER, CLOSING THE POPPET. REFUEL PRESSURE FROM THE SHUTOFF VALVE PISTON CHAMBER COMBINES WITH REFUEL PRESSURE FLOWING THROUGH THE CHECK VALVE TO FILL THE BOWL. WHEN THE BOWL FILLS, THE FLOAT RAISES, CLOSING THE PILOT AND CAUSING THE SHUTOFF VALVE TO CLOSE.

Figure 1. Fuel System Component Operation (Sheet 5)



# FUEL LEVEL CONTROL SHUTOFF VALVE AND HIGH LEVEL PILOT VALVE (2800095)



FUEL LEVEL CONTROL SHUTOFF VALVE

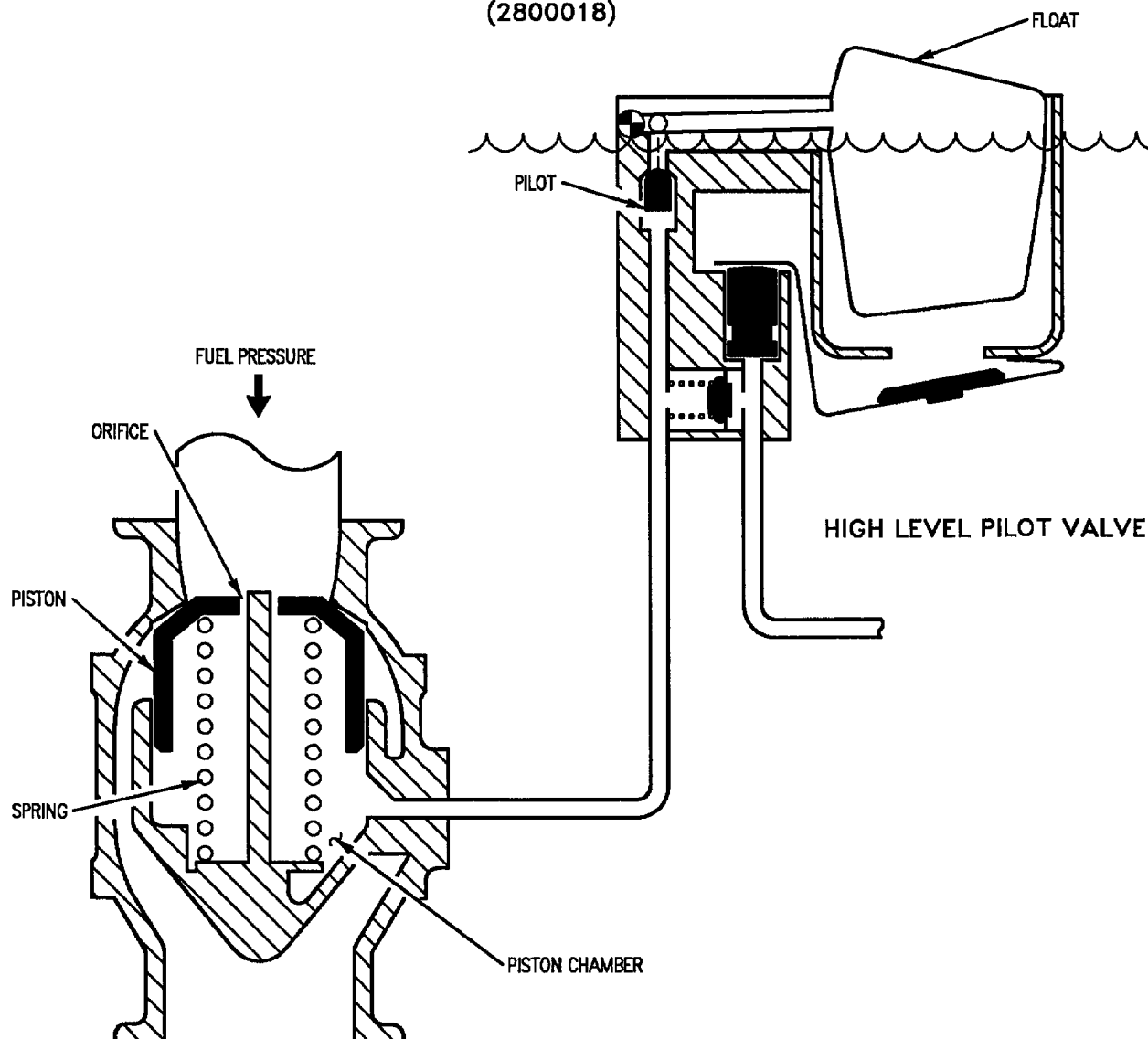
## STOP REFUELING

FUEL LEVEL RAISES THE HIGH LEVEL PILOT VALVE FLOAT AND CLOSES THE PILOT. FUEL FLOW THROUGH THE PISTON CHAMBER IS NO LONGER RELIEVED THROUGH THE HIGH LEVEL PILOT VALVE CAUSING FUEL PRESSURE INSIDE THE PISTON CHAMBER AND INLET FUEL PRESSURE OUTSIDE THE PISTON CHAMBER TO EQUALIZE. THE STATIC PRESSURE AREA INSIDE THE PISTON CHAMBER IS GREATER THAN THE AREA OUTSIDE THE PISTON AT THE SHUTOFF VALVE INLET. THE STATIC PRESSURE AND THE PISTON SPRING PRESSURE CLOSE THE PISTON STOPPING REFUELING TO THE TANK. THE ORIFICE ALLOWS EQUALIZATION OF ANY PRESSURE FLUCTUATIONS TO KEEP THE PISTON CLOSED.

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Figure 1. Fuel System Component Operation (Sheet 6)

# FUEL LEVEL CONTROL SHUTOFF VALVE AND HIGH LEVEL PILOT VALVE (2800018)



## FUEL LEVEL CONTROL SHUTOFF VALVE

### STOP REFUELING

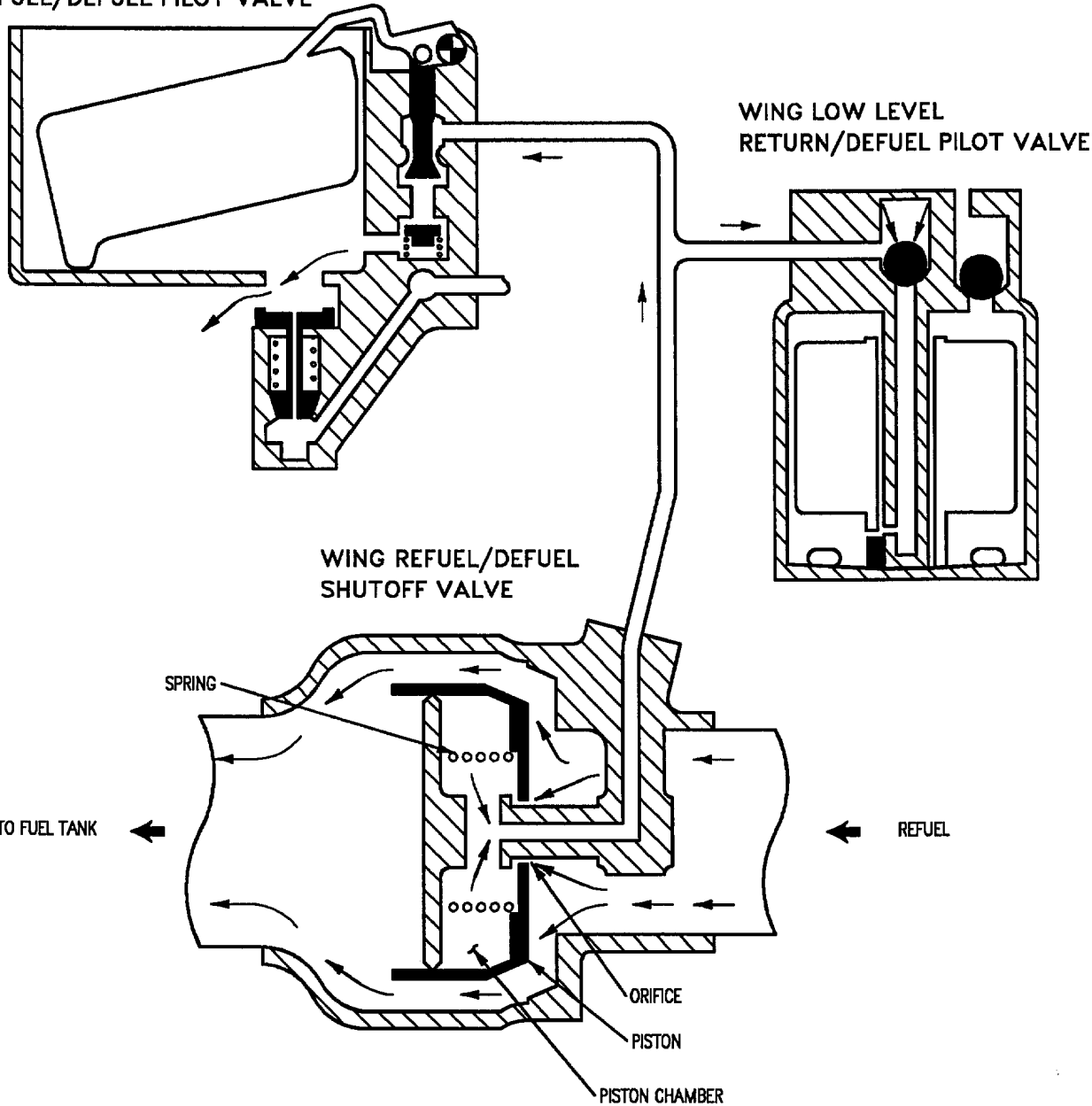
FUEL LEVEL RAISES THE HIGH LEVEL PILOT VALVE FLOAT AND CLOSES THE PILOT. FUEL FLOW THROUGH THE PISTON CHAMBER IS NO LONGER RELIEVED THROUGH THE HIGH LEVEL PILOT VALVE CAUSING FUEL PRESSURE INSIDE THE PISTON CHAMBER AND INLET FUEL PRESSURE OUTSIDE THE PISTON CHAMBER TO EQUALIZE. THE STATIC PRESSURE AREA INSIDE THE PISTON CHAMBER IS GREATER THAN THE AREA OUTSIDE THE PISTON AT THE SHUTOFF VALVE INLET. THE STATIC PRESSURE AND THE PISTON SPRING PRESSURE CLOSE THE PISTON STOPPING REFUELING TO THE TANK. THE ORIFICE ALLOWS EQUALIZATION OF ANY PRESSURE FLUCTUATIONS TO KEEP THE PISTON CLOSED.

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Figure 1. Fuel System Component Operation (Sheet 7)

# WING REFUEL/DEFUEL SHUTOFF, HIGH LEVEL PILOT, AND LOW LEVEL PILOT VALVES

WING HIGH LEVEL  
REFUEL/DEFUEL PILOT VALVE

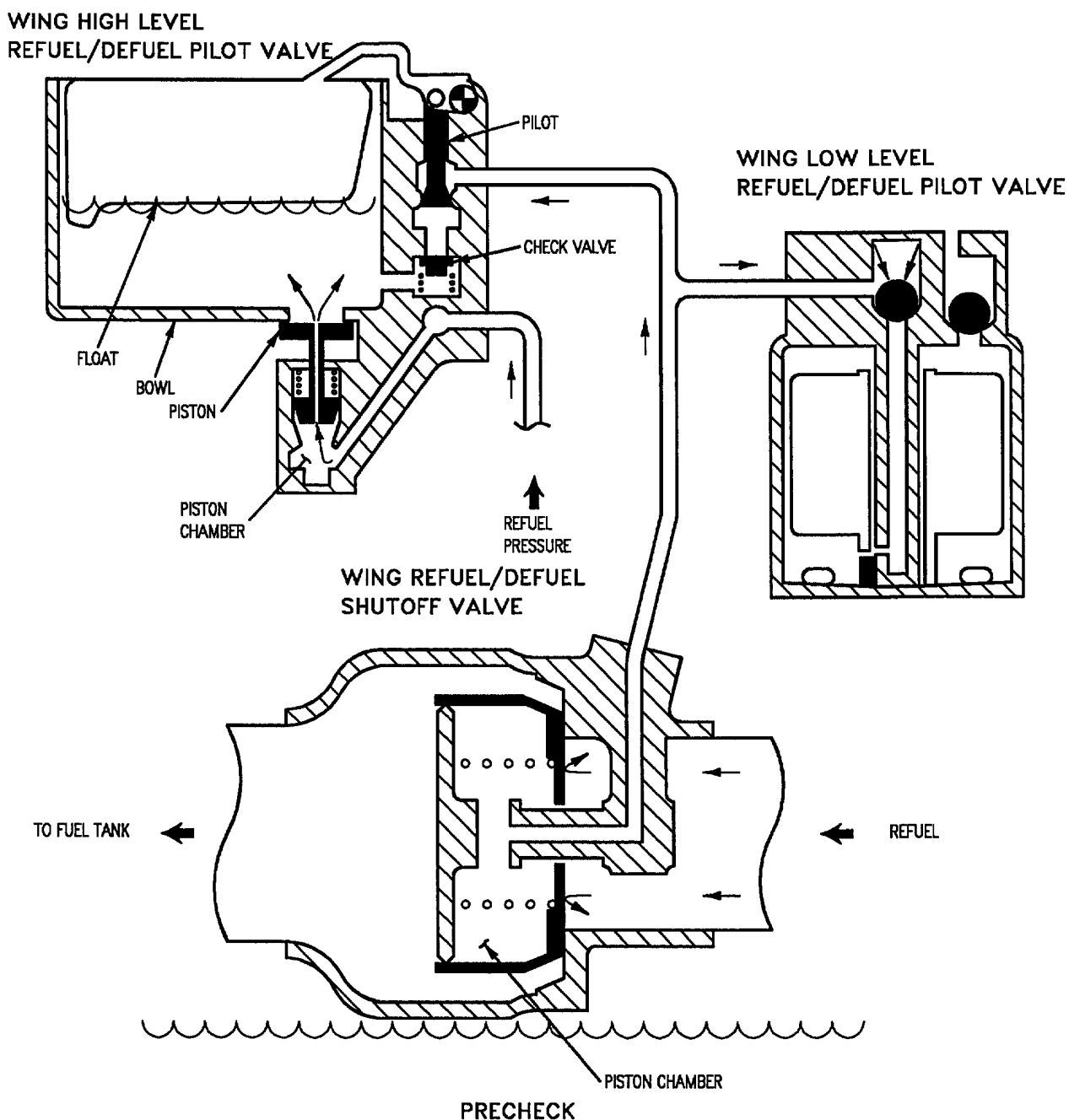


## REFUELING

WHEN WING TANK FUEL LEVEL IS BELOW THE HIGH LEVEL PILOT VALVE, REFUEL PRESSURE APPLIED TO THE SHUTOFF VALVE PISTON CAUSES FUEL IN THE PISTON CHAMBER TO RELIEVE THROUGH THE HIGH LEVEL PILOT VALVE. AS FUEL AMOUNT IN PISTON CHAMBER DECREASES, FUEL PRESSURE OVERCOMES SPRING PRESSURE AND OPENS PISTON, ALLOWING WING TANK TO REFUEL.

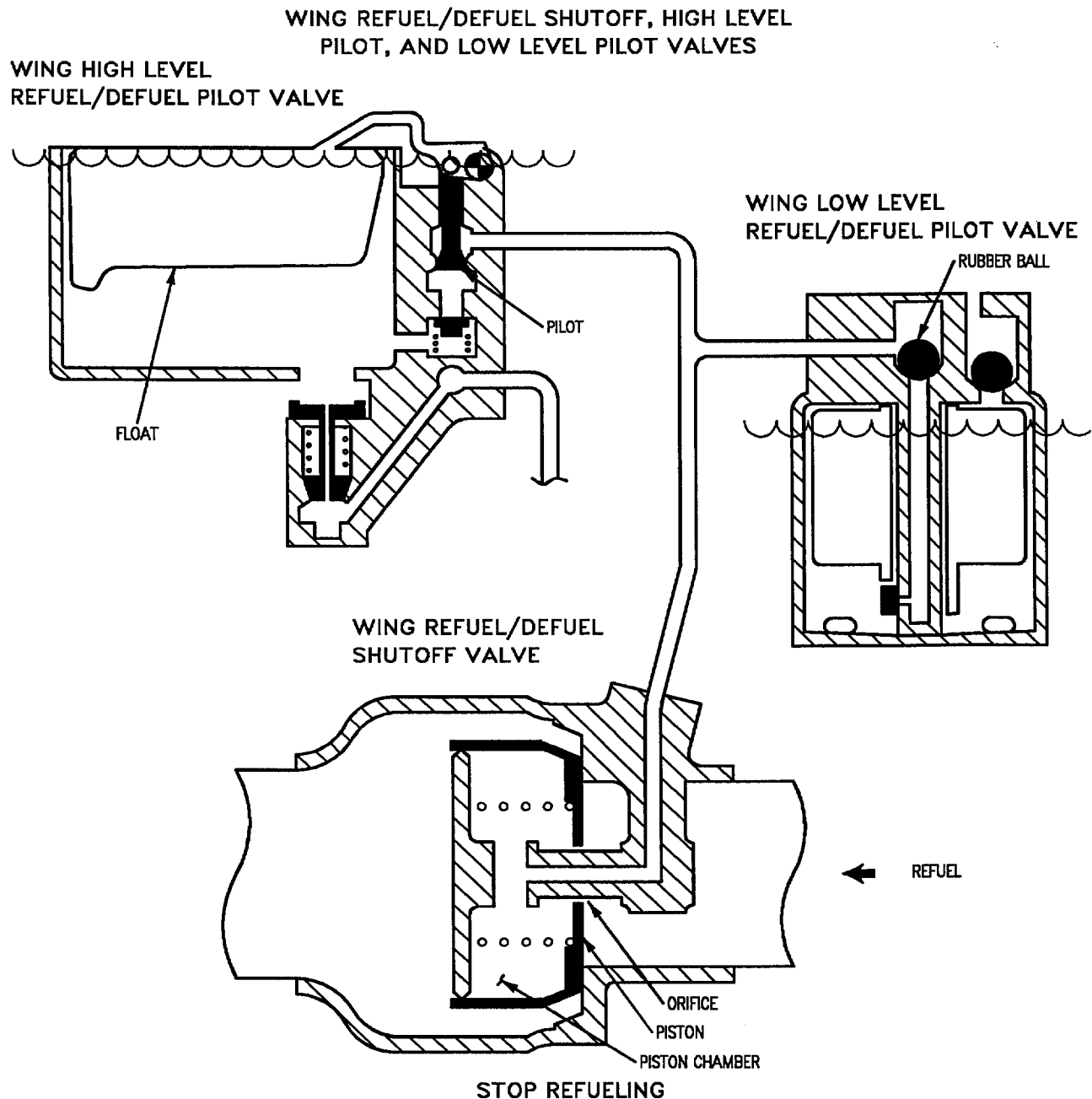
Figure 1. Fuel System Component Operation (Sheet 8)

# WING REFUEL/DEFUEL SHUTOFF, HIGH LEVEL PILOT, AND LOW LEVEL PILOT VALVES



DURING PRECHECK, REFUEL PRESSURE IS APPLIED TO THE HIGH LEVEL PILOT VALVE PISTON CHAMBER, CLOSING THE PISTON. FUEL FROM THE SHUTOFF VALVE PISTON CHAMBER AND HIGH LEVEL PILOT VALVE PISTON CHAMBER FILL BOWL. WHEN THE BOWL FILLS, THE FLOAT RAISES, CLOSING THE PILOT AND CAUSING THE SHUTOFF VALVE TO CLOSE.

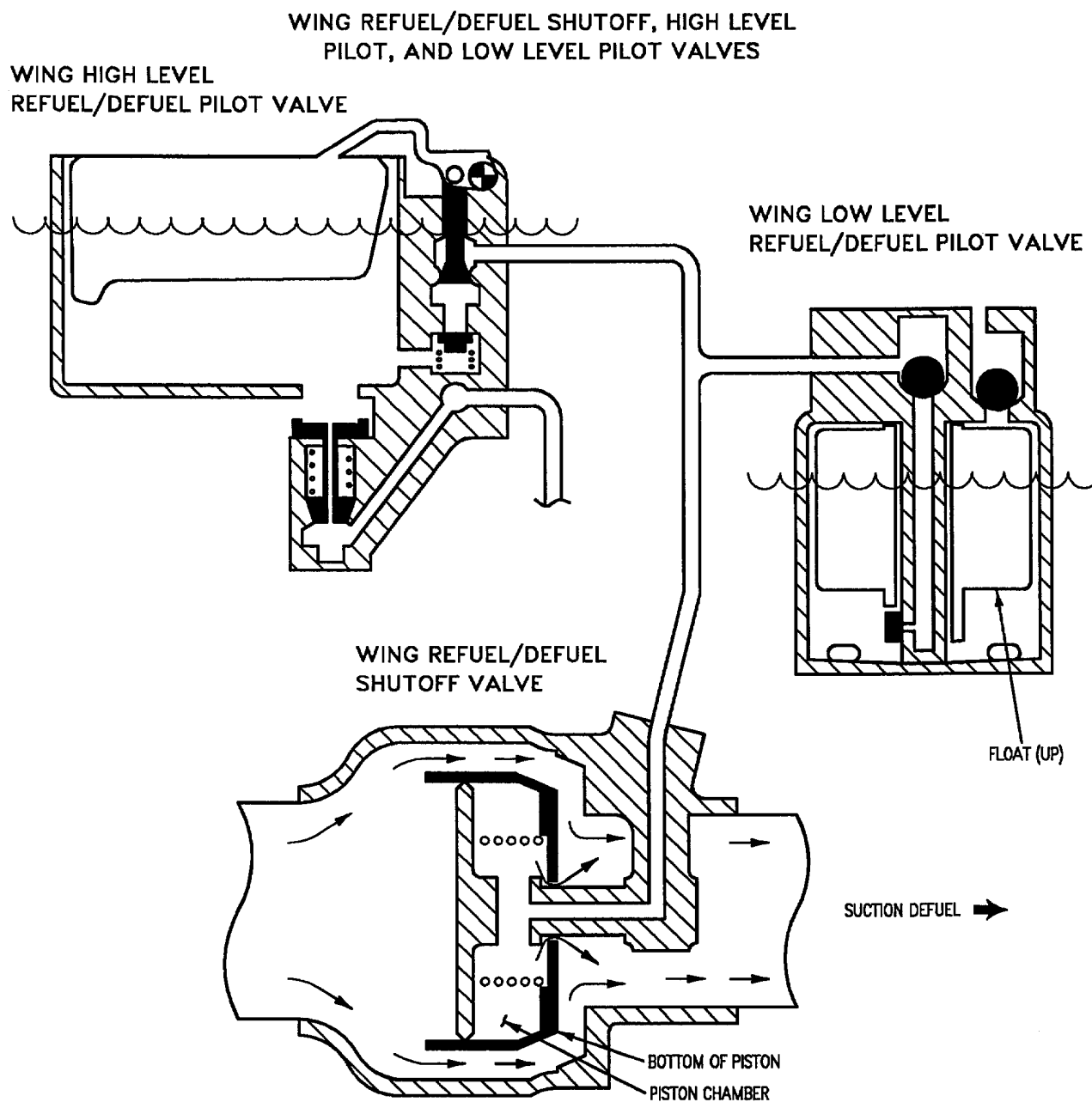
Figure 1. Fuel System Component Operation (Sheet 9)

**STOP REFUELING**

WING TANKS REFUEL UNTIL FUEL LEVEL RAISES THE HIGH LEVEL PILOT VALVE FLOAT, CLOSING PILOT. FUEL FLOW THROUGH THE PISTON CHAMBER IS NO LONGER RELIEVED THROUGH THE HIGH LEVEL PILOT VALVE CAUSING FUEL PRESSURE INSIDE THE PISTON CHAMBER AND INLET FUEL PRESSURE OUTSIDE THE PISTON CHAMBER TO EQUALIZE. THE STATIC PRESSURE AREA INSIDE THE PISTON CHAMBER IS GREATER THAN THE AREA OUTSIDE THE PISTON AT THE SHUTOFF VALVE INLET. THE STATIC PRESSURE AND THE PISTON SPRING PRESSURE CLOSE THE PISTON STOPPING REFUELING TO THE TANK. THE ORIFICE ALLOWS EQUALIZATION OF ANY PRESSURE FLUCTUATIONS TO KEEP THE PISTON CLOSED.

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**Figure 1. Fuel System Component Operation (Sheet 10)**



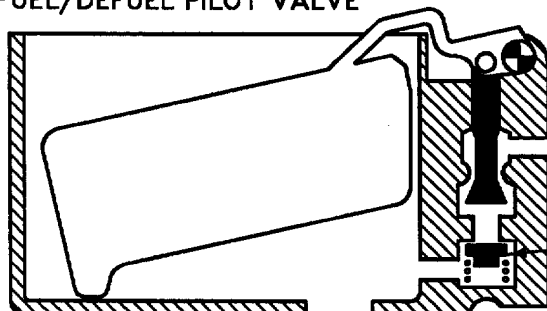
### SUCTION DEFUELING

SUCTION DEFUEL PRESSURE ACTS ON THE INSIDE PISTON CHAMBER AND THE BOTTOM OUTSIDE PISTON AREA OF THE SHUTOFF VALVE. THE PRESSURE DIFFERENCE OVER THE LARGER INSIDE AREA OF THE PISTON CHAMBER OVERCOMES THAT OF THE SMALLER OUTSIDE AREA AND CAUSES THE PISTON TO SNAP OPEN.

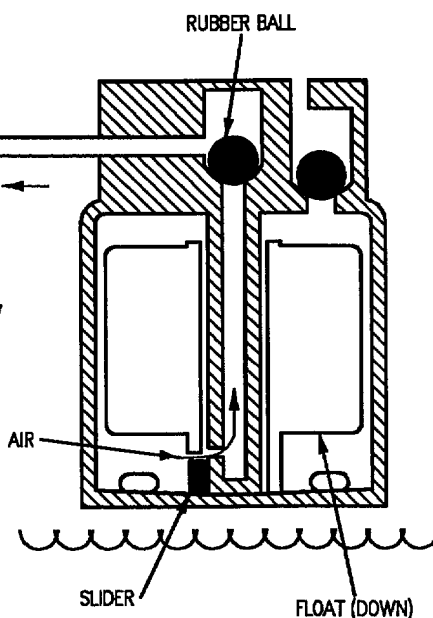
**Figure 1. Fuel System Component Operation (Sheet 11)**

# WING REFUEL/DEFUEL SHUTOFF, HIGH LEVEL PILOT, AND LOW LEVEL PILOT VALVES

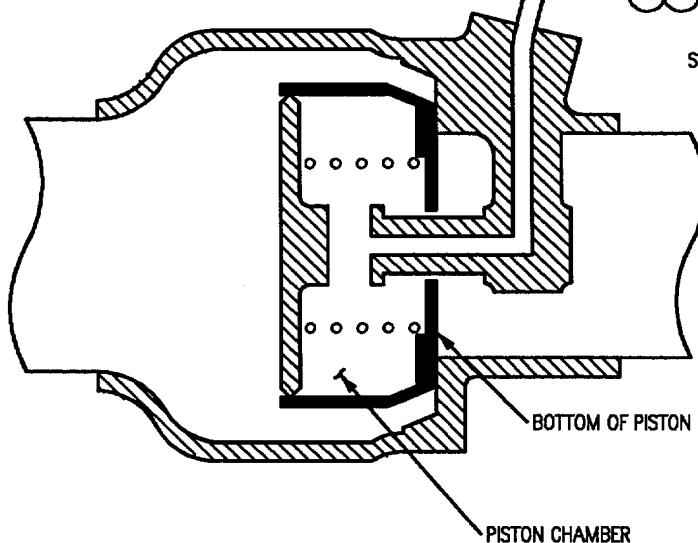
WING HIGH LEVEL  
REFUEL/DEFUEL PILOT VALVE



WING LOW LEVEL  
REFUEL/DEFUEL PILOT VALVE



WING REFUEL/DEFUEL  
SHUTOFF VALVE



## STOP DEFUELING—LOW LEVEL PILOT VALVE SHUTOFF

WING TANKS DEFUEL UNTIL THE FLOAT BOTTOMS IN THE LOW LEVEL PILOT VALVE AND SLIDER OPENS AN AIR INLET PORT. A SMALL AMOUNT OF AIR FLOWS PAST THE RUBBER BALL AND BREAKS SUCTION PRESSURE IN THE PISTON CHAMBER CAUSING SPRING PRESSURE TO CLOSE THE SHUTOFF VALVE. THIS PREVENTS BREAKING SYSTEM SUCTION WHICH WOULD STOP FUSELAGE DEFUEL. A CHECK VALVE IN THE HIGH LEVEL PILOT VALVE PREVENTS AIR FROM CLOSING THE SHUTOFF VALVE PREMATURELY.

Figure 1. Fuel System Component Operation (Sheet 12)

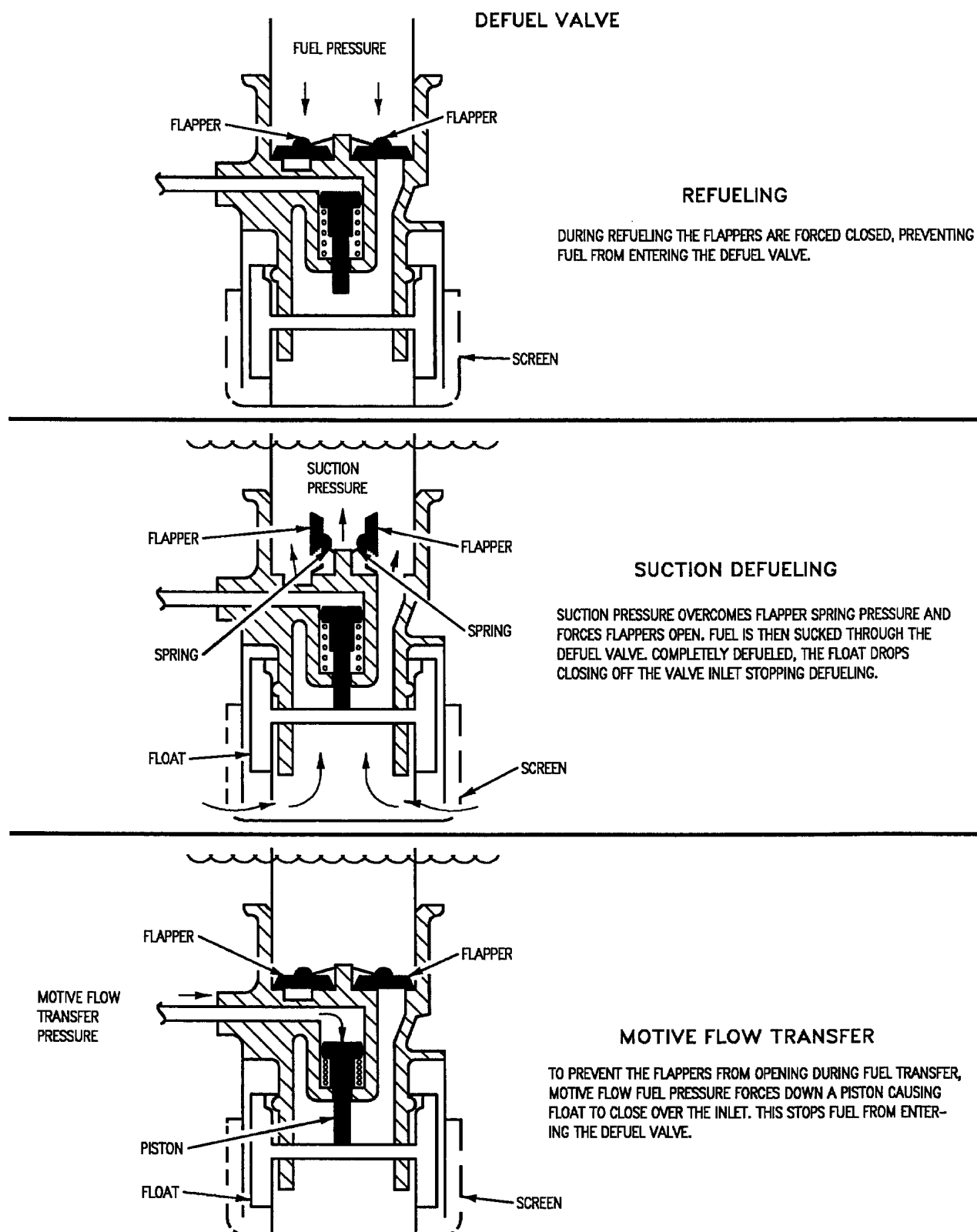
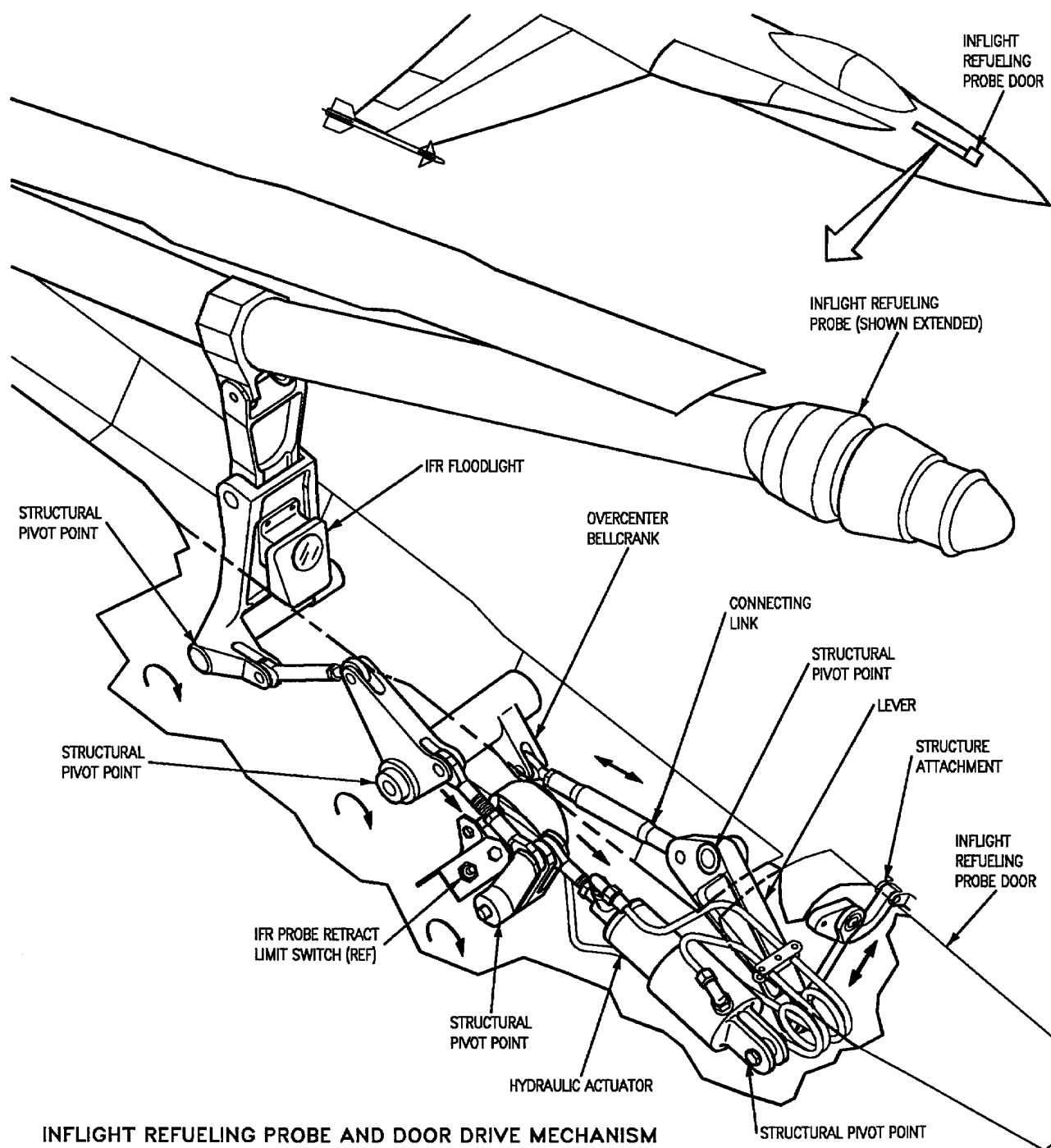


Figure 1. Fuel System Component Operation (Sheet 13)



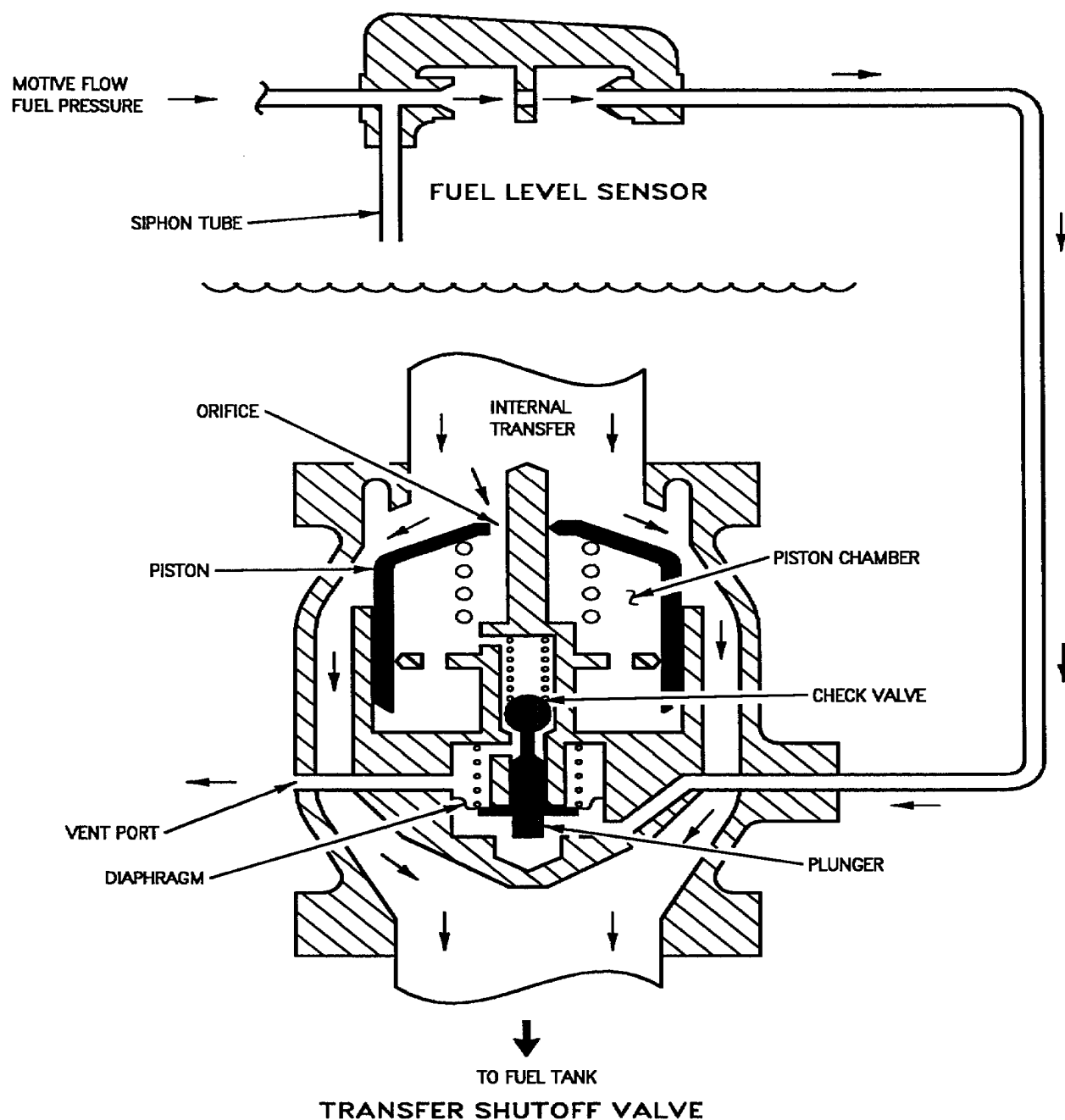


### INFLIGHT REFUELING PROBE AND DOOR DRIVE MECHANISM

THE INFLIGHT REFUELING PROBE AND LINKAGE ARE ACTUATED HYDRAULICALLY. THE PROBE STOPS IN THE EXTEND POSITION WHEN THE HYDRAULIC ACTUATOR IS FULLY RETRACTED. THE INFLIGHT REFUELING PROBE DOOR IS CLOSED WHEN THE PROBE IS COMPLETELY EXTENDED OR RETRACTED. THE OVER CENTER BELLCRANK IS CONNECTED TO THE DOOR BY A LEVER AND CONNECTING LINK. THE DOOR OPENS AS THE LINKAGE ROTATES AROUND THE BELLCRANK WHILE THE PROBE RETRACTS OR EXTENDS.

Figure 1. Fuel System Component Operation (Sheet 14)

# NO. 2 AND NO. 3 FUEL TANK TRANSFER SHUTOFF VALVE AND FUEL LEVEL SENSOR



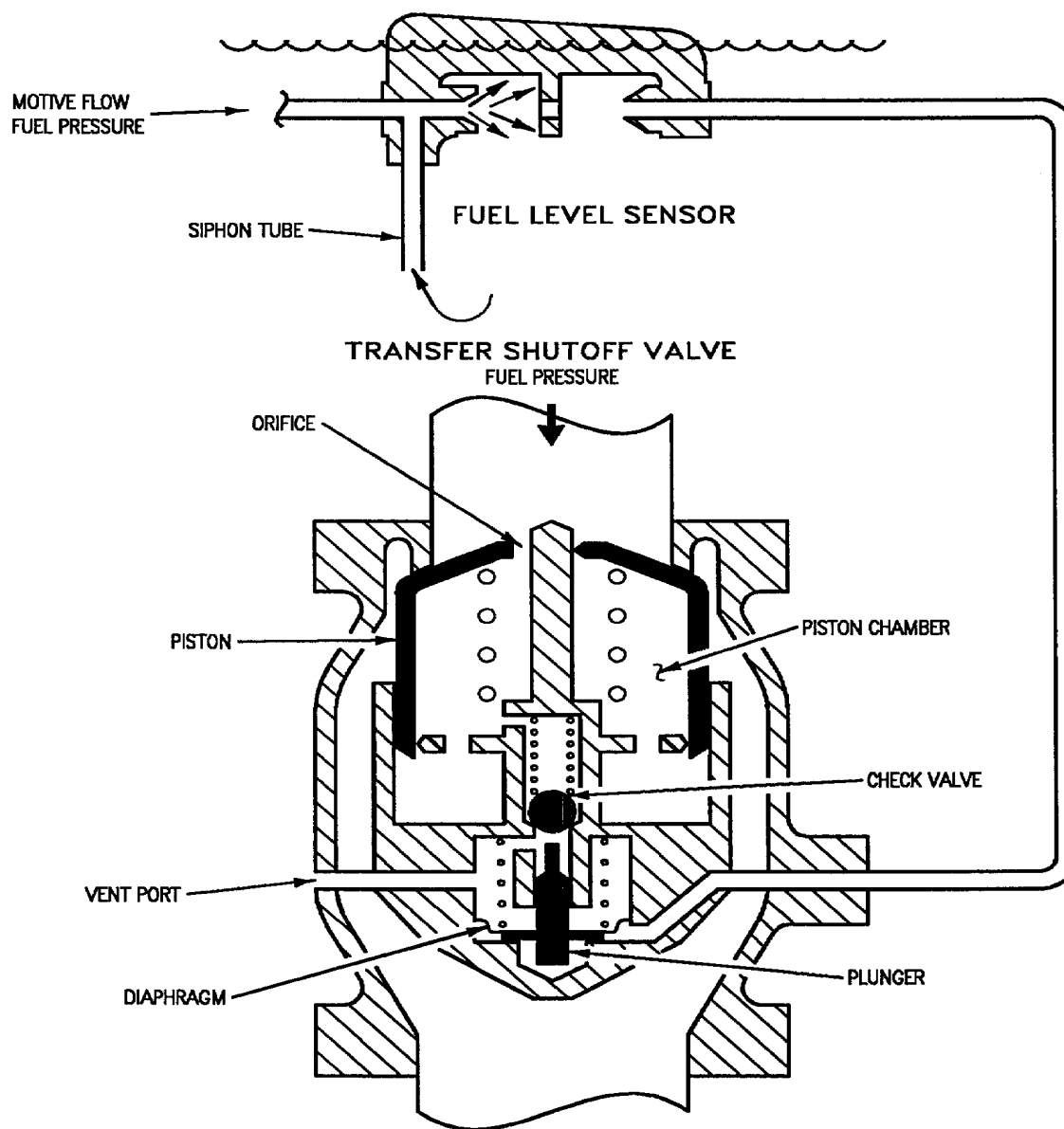
## TRANSFER

MOTIVE FLOW FUEL PRESSURE BRIDGES THE FUEL LEVEL SENSOR AND FLOWS TO THE TRANSFER SHUTOFF VALVE, DIAPHRAGM AND PLUNGER. THE PLUNGER UNSEATS A CHECK VALVE ALLOWING TRANSFER FUEL PRESSURE ENTERING THE PISTON CHAMBER TO BE RELIEVED THROUGH A VENT PORT CAUSING THE PISTON TO OVERCOME SPRING PRESSURE AND OPEN.

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Figure 1. Fuel System Component Operation (Sheet 15)

# NO. 2 AND NO. 3 FUEL TANK TRANSFER SHUTOFF VALVE AND FUEL LEVEL SENSOR



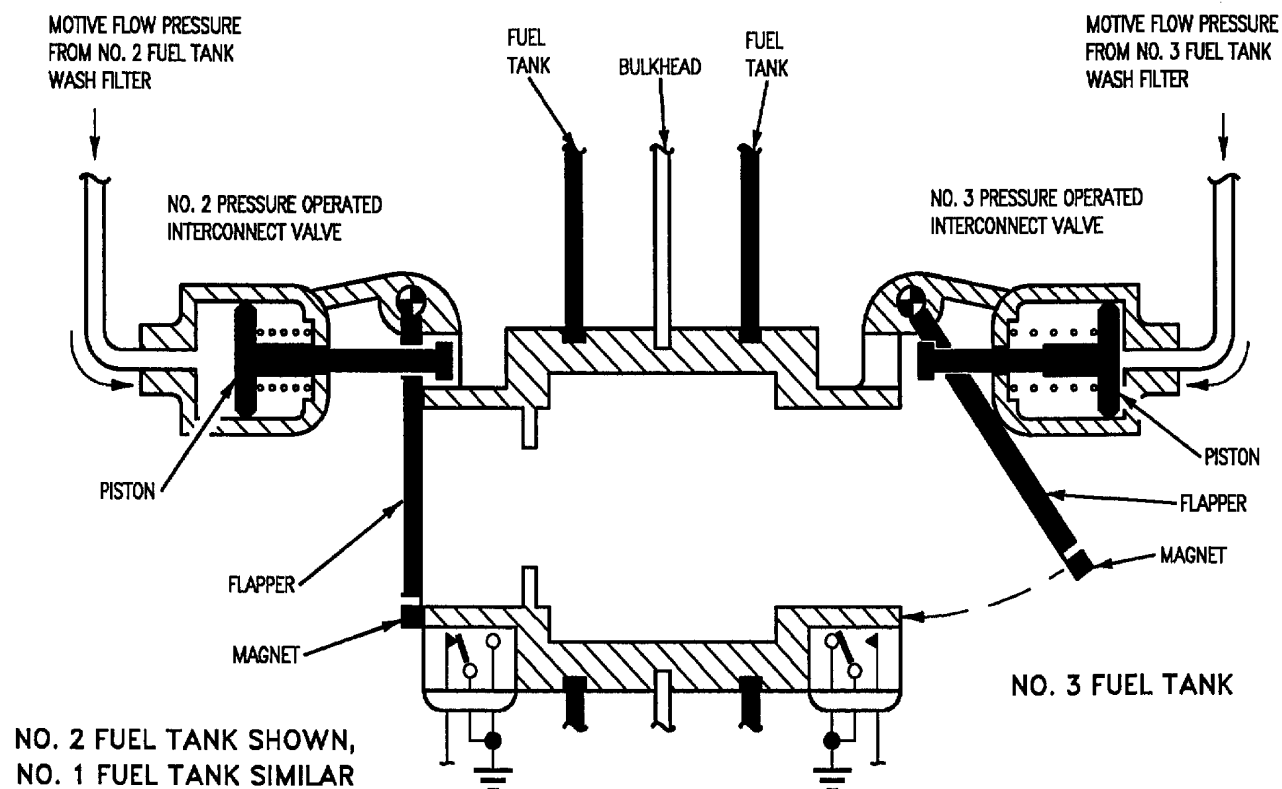
## STOP FUEL TRANSFER

AS FUEL LEVEL IN THE FEED TANKS RISES TO THE FUEL LEVEL SENSOR, THE MOTIVE FLOW JET STREAM IS INTERRUPTED. THIS CAUSES THE SHUTOFF VALVE DIAPHRAGM AND PLUNGER TO RETRACT, CLOSING THE CHECK VALVE. FUEL FLOW THROUGH THE PISTON CHAMBER IS NO LONGER RELIEVED THROUGH THE VENT PORT CAUSING FUEL PRESSURE INSIDE THE PISTON CHAMBER AND INLET FUEL PRESSURE OUTSIDE THE PISTON CHAMBER TO EQUALIZE. THE STATIC PRESSURE AREA INSIDE THE PISTON CHAMBER IS GREATER THAN THE AREA OUTSIDE THE PISTON AT THE SHUTOFF

VALVE INLET. THE STATIC PRESSURE AND THE PISTON SPRING PRESSURE CLOSE THE VALVE STOPPING TRANSFER TO THE TANK. THE ORIFICE ALLOWS EQUALIZATION OF ANY PRESSURE FLUCTUATIONS TO KEEP THE PISTON CLOSED. AS THE FUEL LEVEL LOWERS BELOW THE FUEL LEVEL SENSOR, FUEL IS DRAWN THROUGH THE SIPHON TUBE. MOTIVE FLOW FUEL PRESSURE IS INTERRUPTED UNTIL THE FUEL LEVEL IS BELOW THE SIPHON TUBE WHICH PREVENTS CONSTANT OPENING AND CLOSING OF THE TRANSFER SHUTOFF VALVE.

Figure 1. Fuel System Component Operation (Sheet 16)

## PRESSURE OPERATED INTERCONNECT VALVES



TRANSFER MOTIVE FLOW PRESSURE EXTENDS THE PISTON CAUSING THE FLAPPER TO SWING CLOSED. IF MOTIVE FLOW PRESSURE IS INTERRUPTED, SPRING PRESSURE RETRACTS THE PISTON. AS THE PISTON RETRACTS, THE FLAPPER OPENS TO ALLOW GRAVITY TRANSFER BETWEEN TANKS. ON 161353 THRU 161761 BEFORE F/A-18 AFC 39 TANKS 2 AND 3, AND ON 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39 TANKS 1, 2, AND 3. THE FLAPPER POSITIONS CAN BE TESTED USING THE FUEL CHECK PANEL IN DOOR 8. WHEN THE FLAPPERS CLOSE, THE MAGNETS CLOSE THE SWITCH ON THE VALVES. THIS PROVIDES A GROUND FOR THE POSITION INDICATOR LIGHTS WHEN TK INTCON V CHK SWITCH IS SET TO CHK.

18AC-460-10-(35-17)22-CAT1

Figure 1. Fuel System Component Operation (Sheet 17)

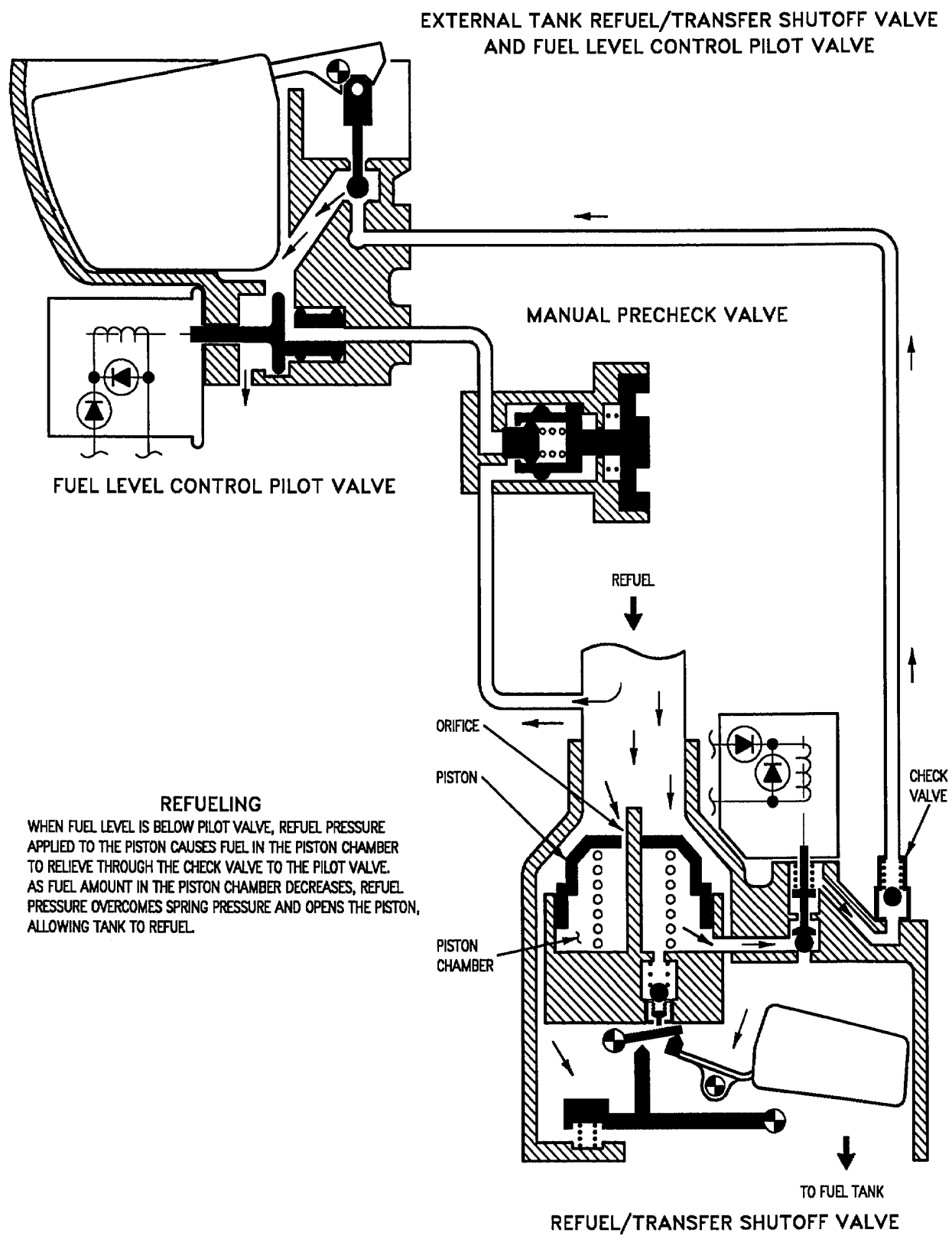


Figure 1. Fuel System Component Operation (Sheet 18)

18AC-460-10-(35-18)J-CAT1

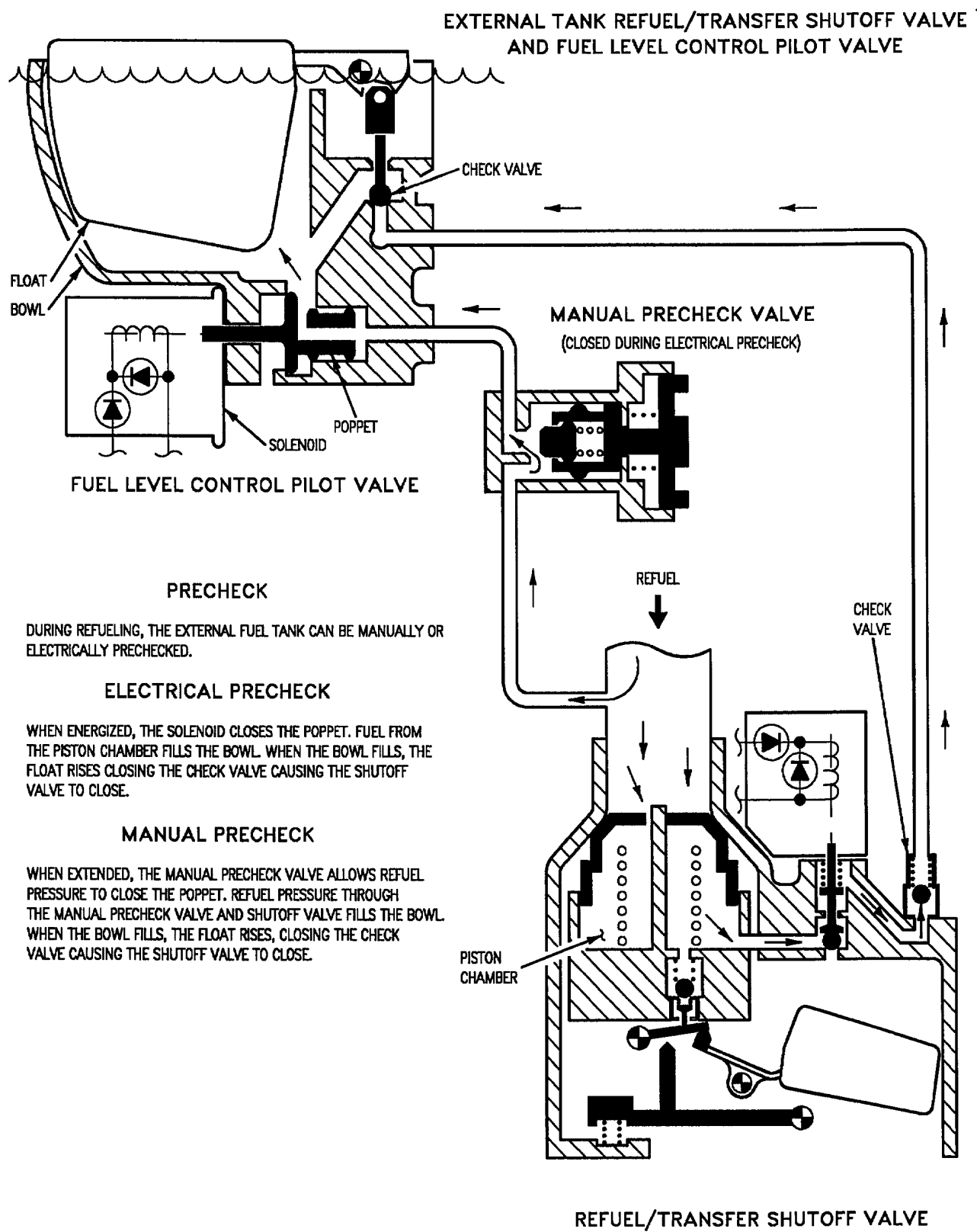
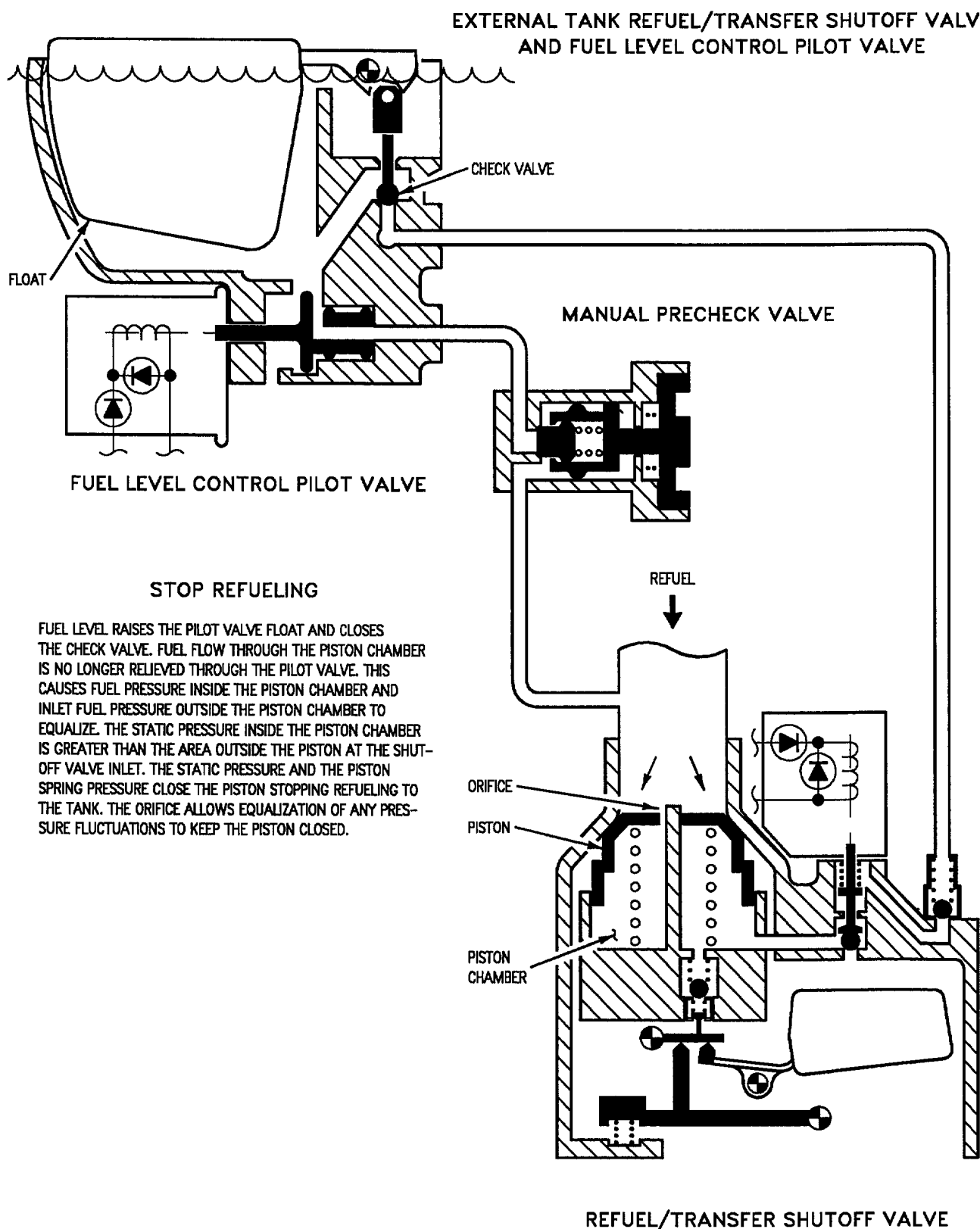


Figure 1. Fuel System Component Operation (Sheet 19)



18AC-460-10-(35-20)H-CATI

Figure 1. Fuel System Component Operation (Sheet 20)

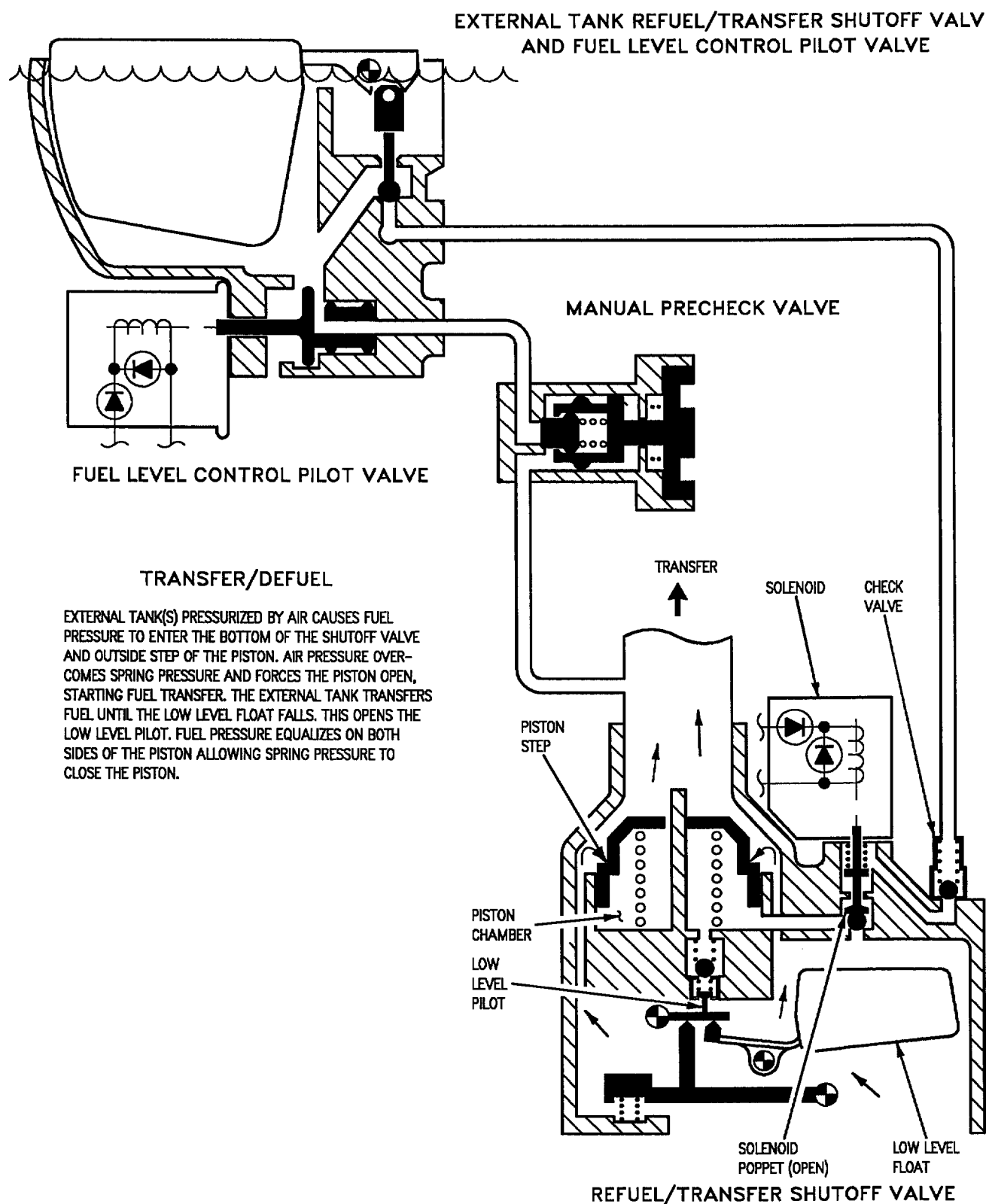


Figure 1. Fuel System Component Operation (Sheet 21)

18AC-460-10-(35-21)H-CAT1



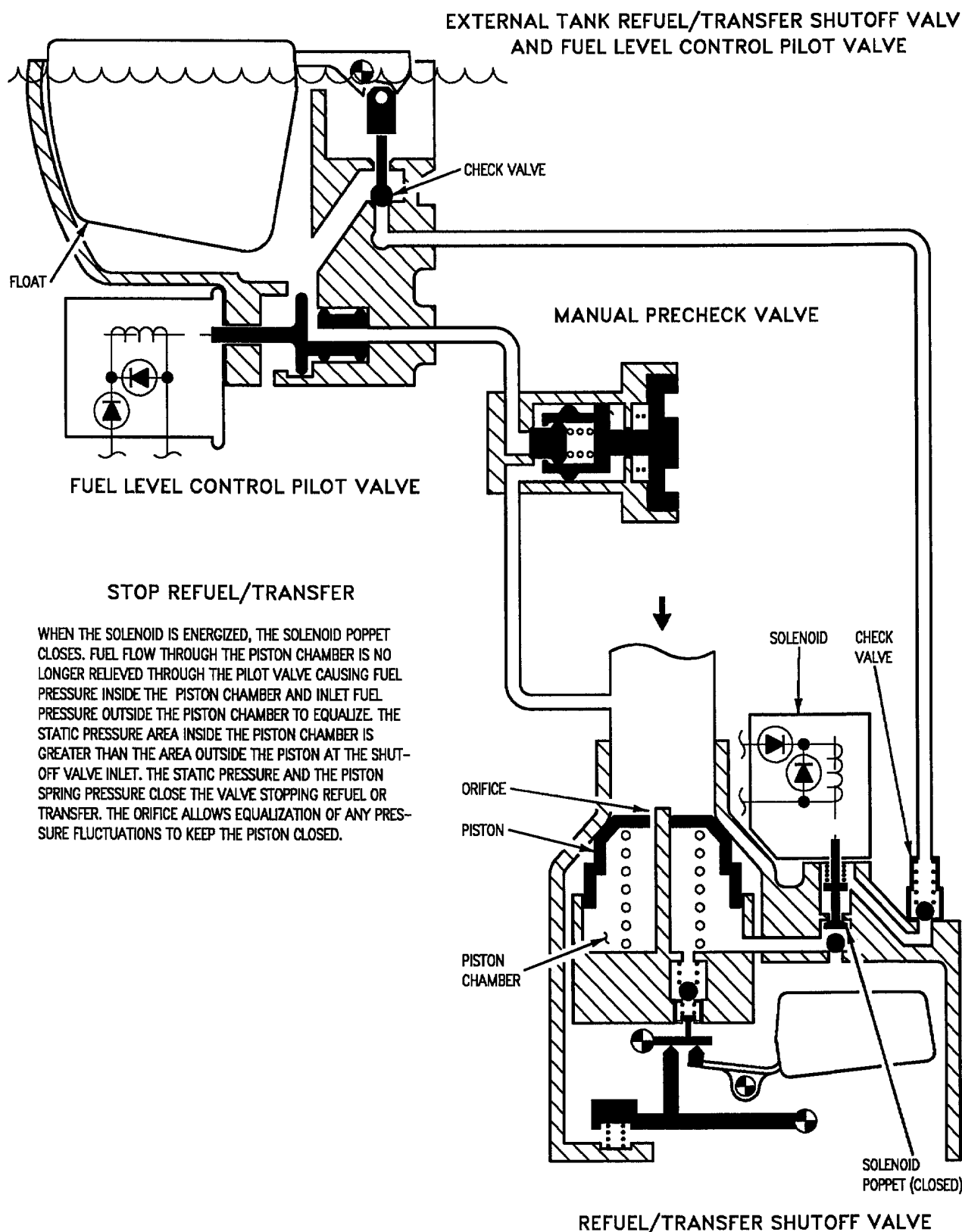


Figure 1. Fuel System Component Operation (Sheet 22)

18AC-460-10-(35-22)H-CATI

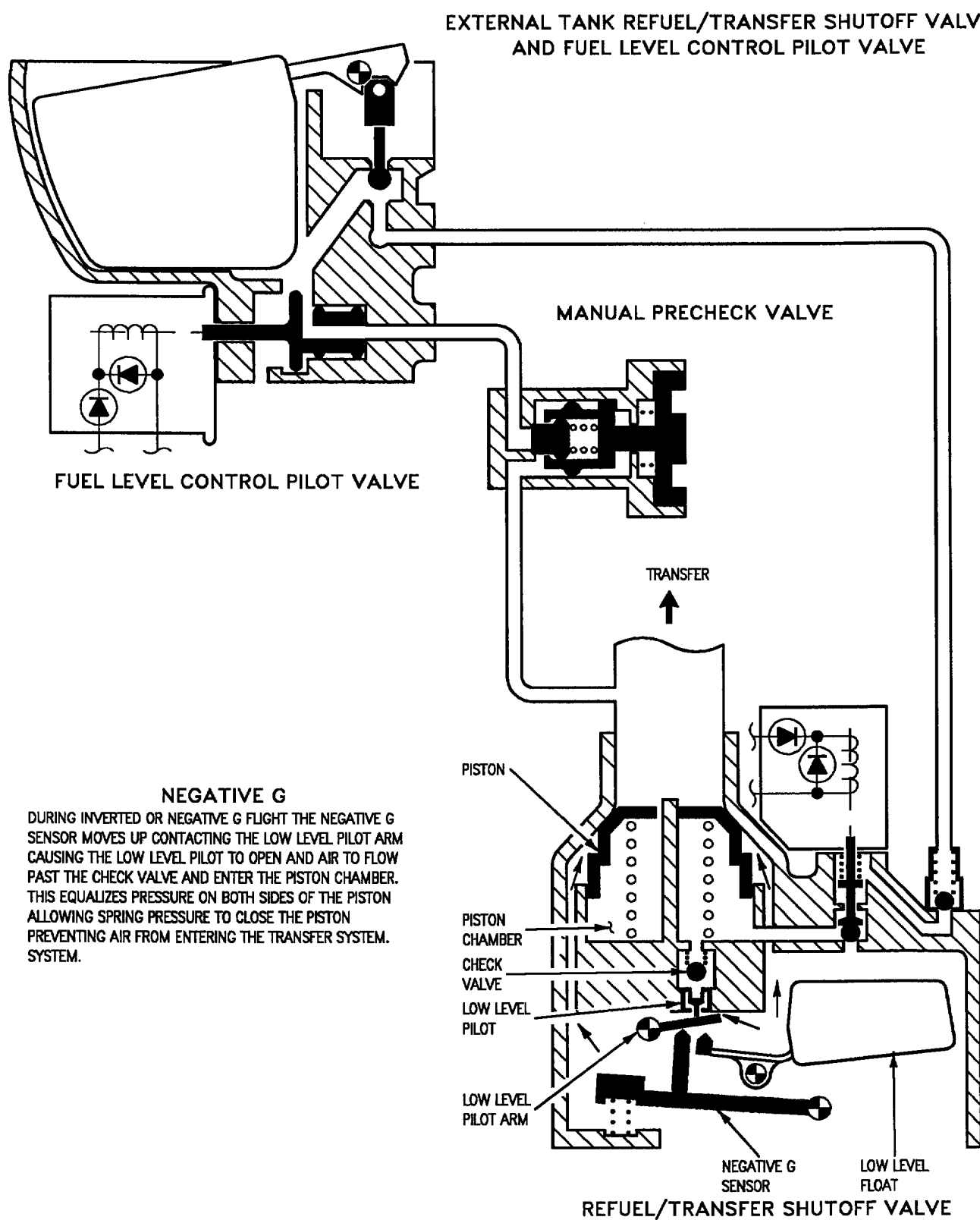


Figure 1. Fuel System Component Operation (Sheet 23)

18AC-460-10-(35-23)H-CAT1

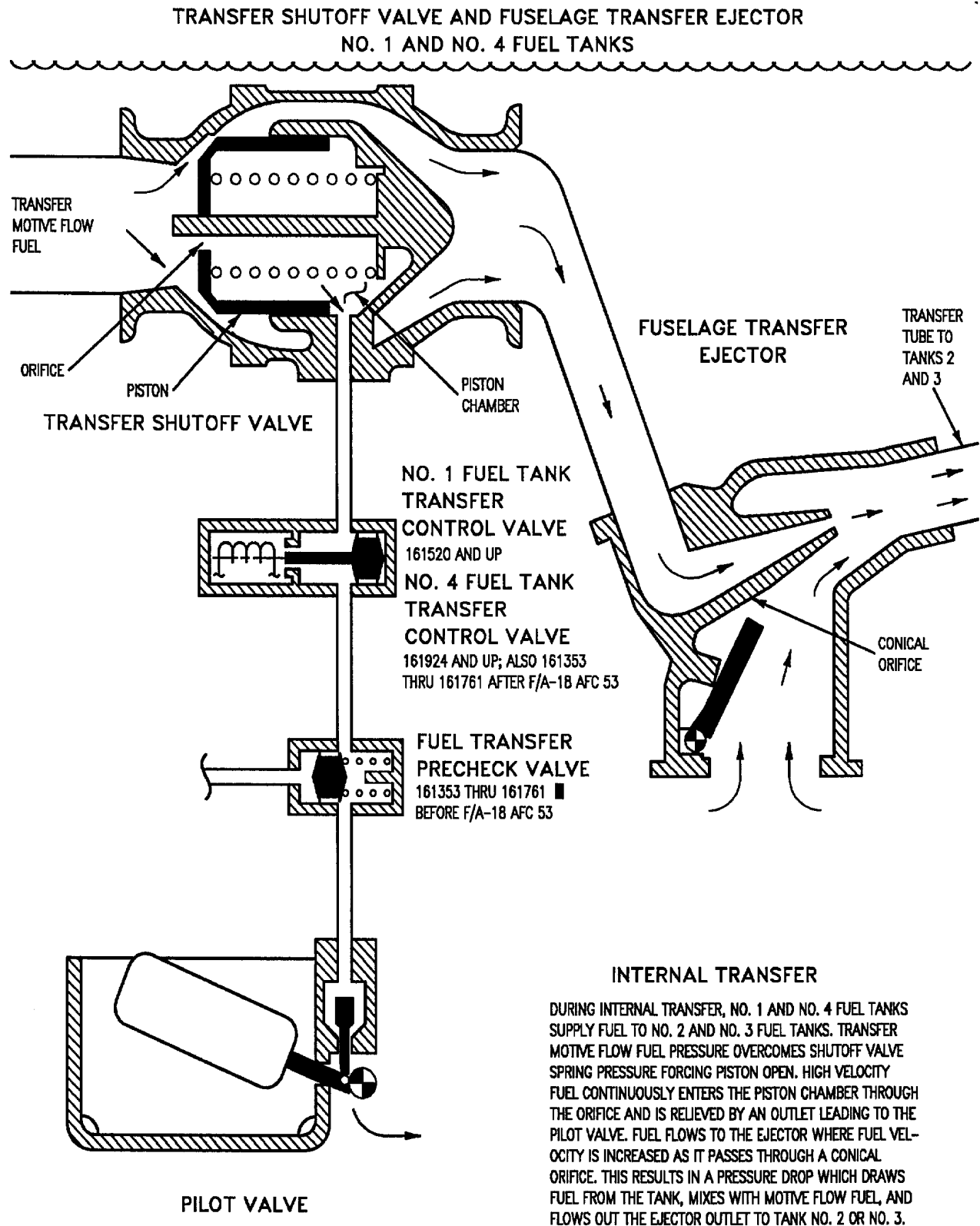
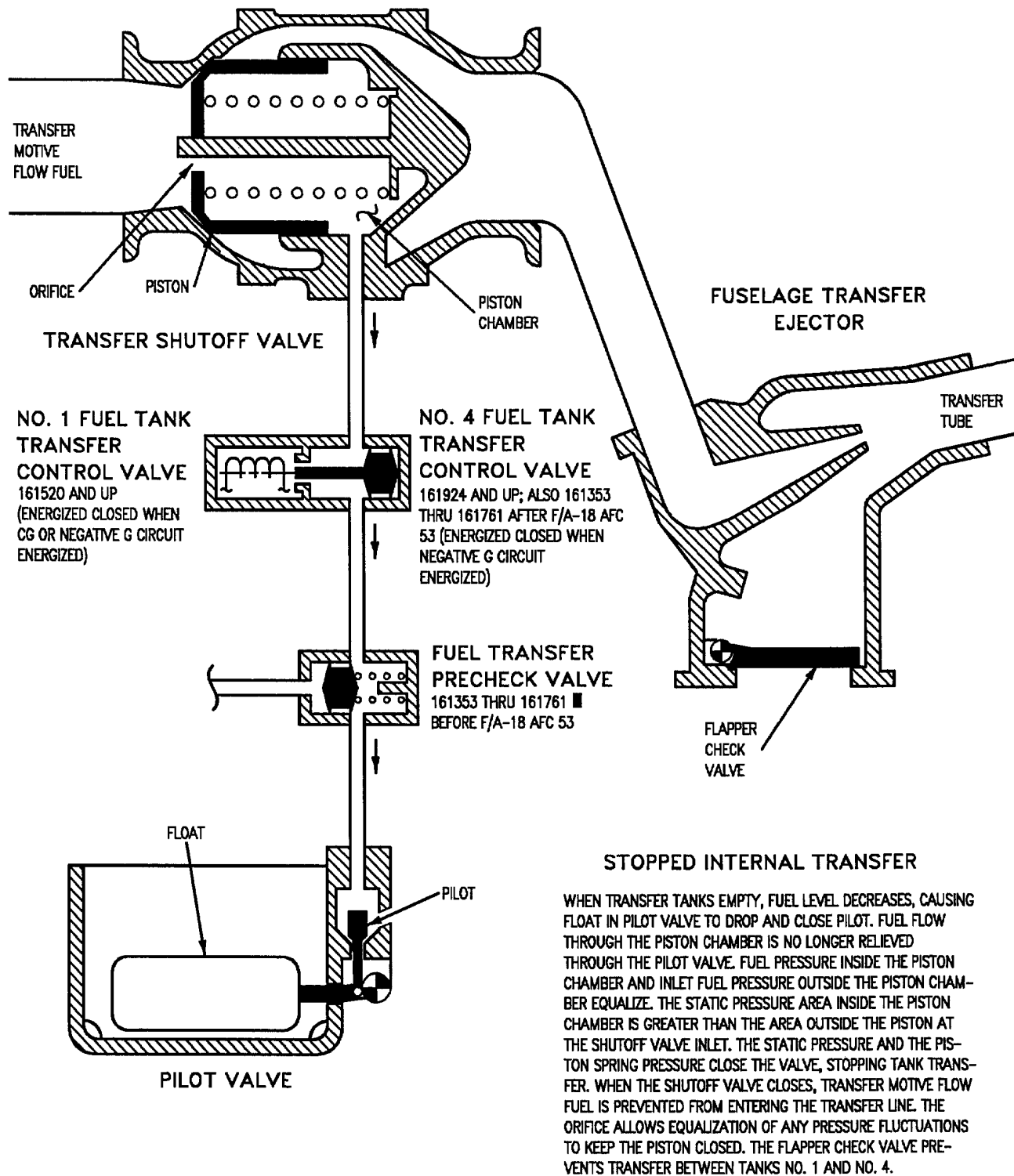


Figure 1. Fuel System Component Operation (Sheet 24)

18AC-460-10-(35-24)22-CATI

# TRANSFER SHUTOFF VALVE AND FUSELAGE TRANSFER EJECTOR NO. 1 AND NO. 4 FUEL TANKS



18AC-460-10-(35-25)22-CAT1

Figure 1. Fuel System Component Operation (Sheet 25)

# TRANSFER SHUTOFF VALVE AND FUSELAGE TRANSFER EJECTOR NO. 1 AND NO. 4 FUEL TANKS

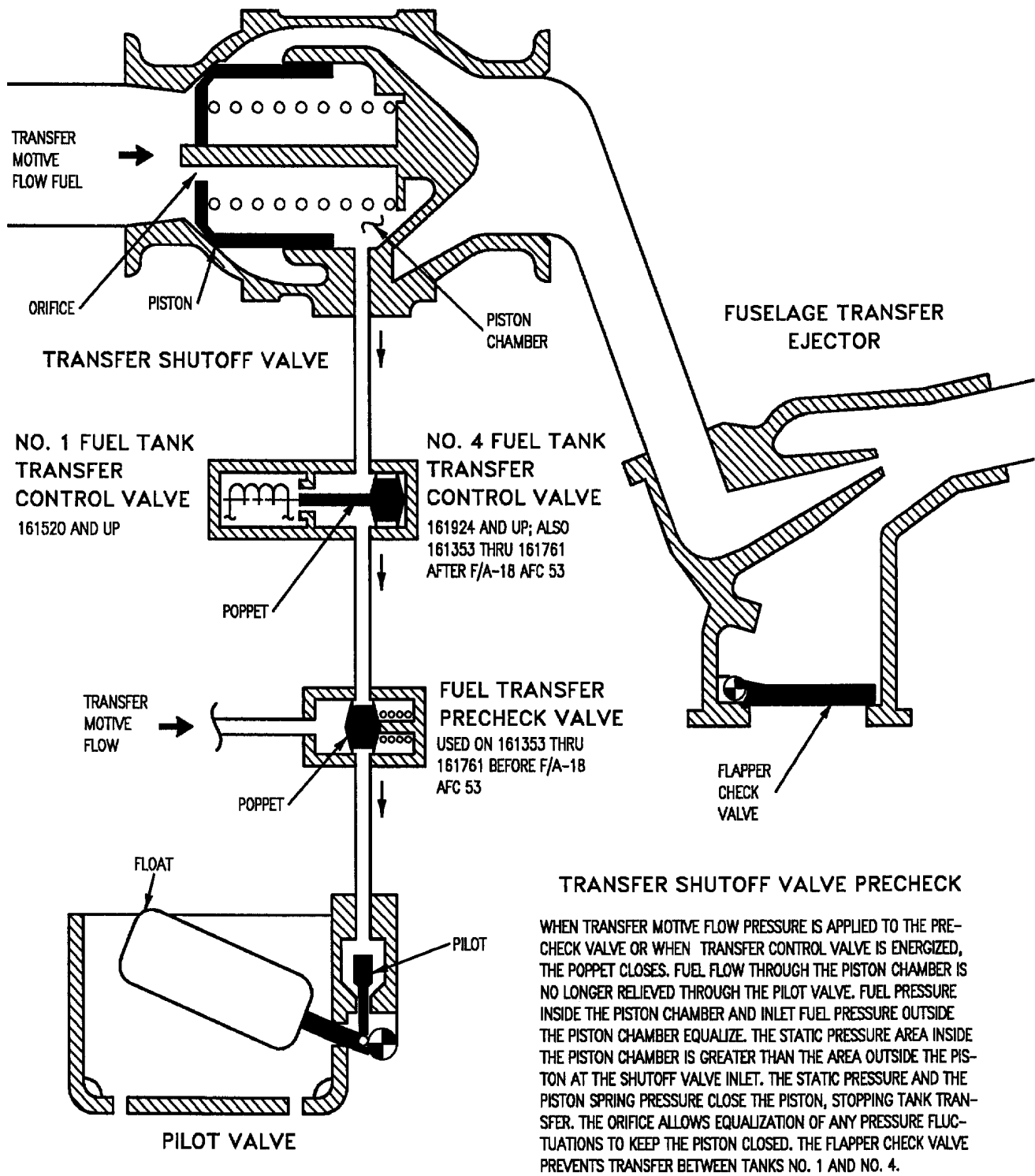
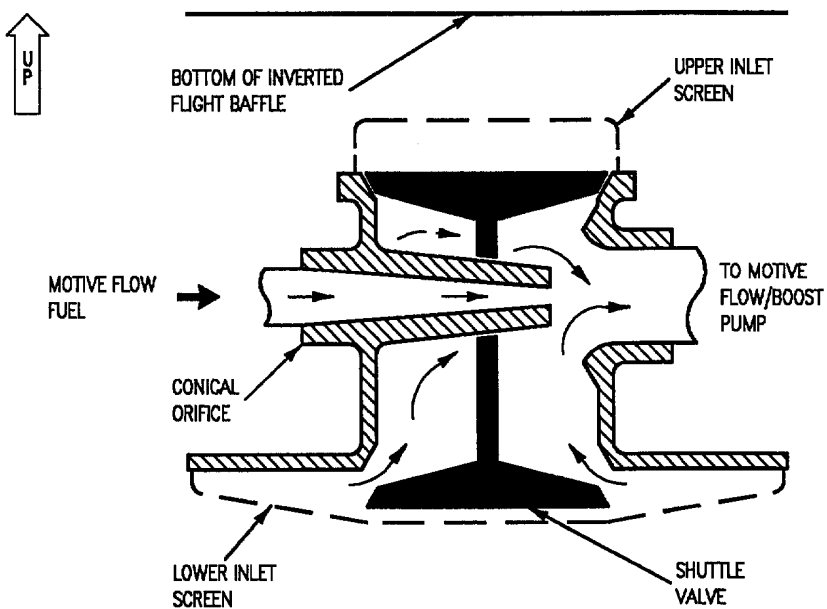


Figure 1. Fuel System Component Operation (Sheet 26)

**ENGINE FUEL BOOST EJECTOR**  
**161353 THRU 161761 BEFORE F/A-18 AFC-18**

**NORMAL FLIGHT, ENGINE FEED**

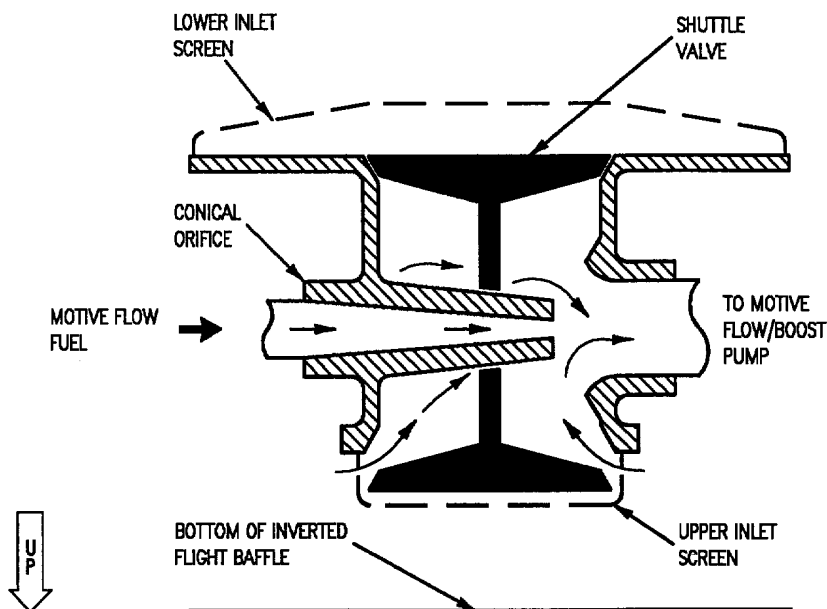
MOTIVE FLOW FUEL FLOWS THROUGH THE CONICAL ORIFICE RESULTING IN A PRESSURE DROP WHICH DRAWS FUEL FROM THE TANK, AND MIXES WITH MOTIVE FLOW FUEL. MIXED FUEL FLOWS OUT THE EJECTOR OUTLET TO THE MOTIVE FLOW/BOOST PUMP. SCREENS OVER THE INLETS PREVENT FOREIGN OBJECTS FROM ENTERING THE EJECTOR.



**ENGINE FUEL BOOST EJECTOR**  
**FUEL TANKS 2 & 3**

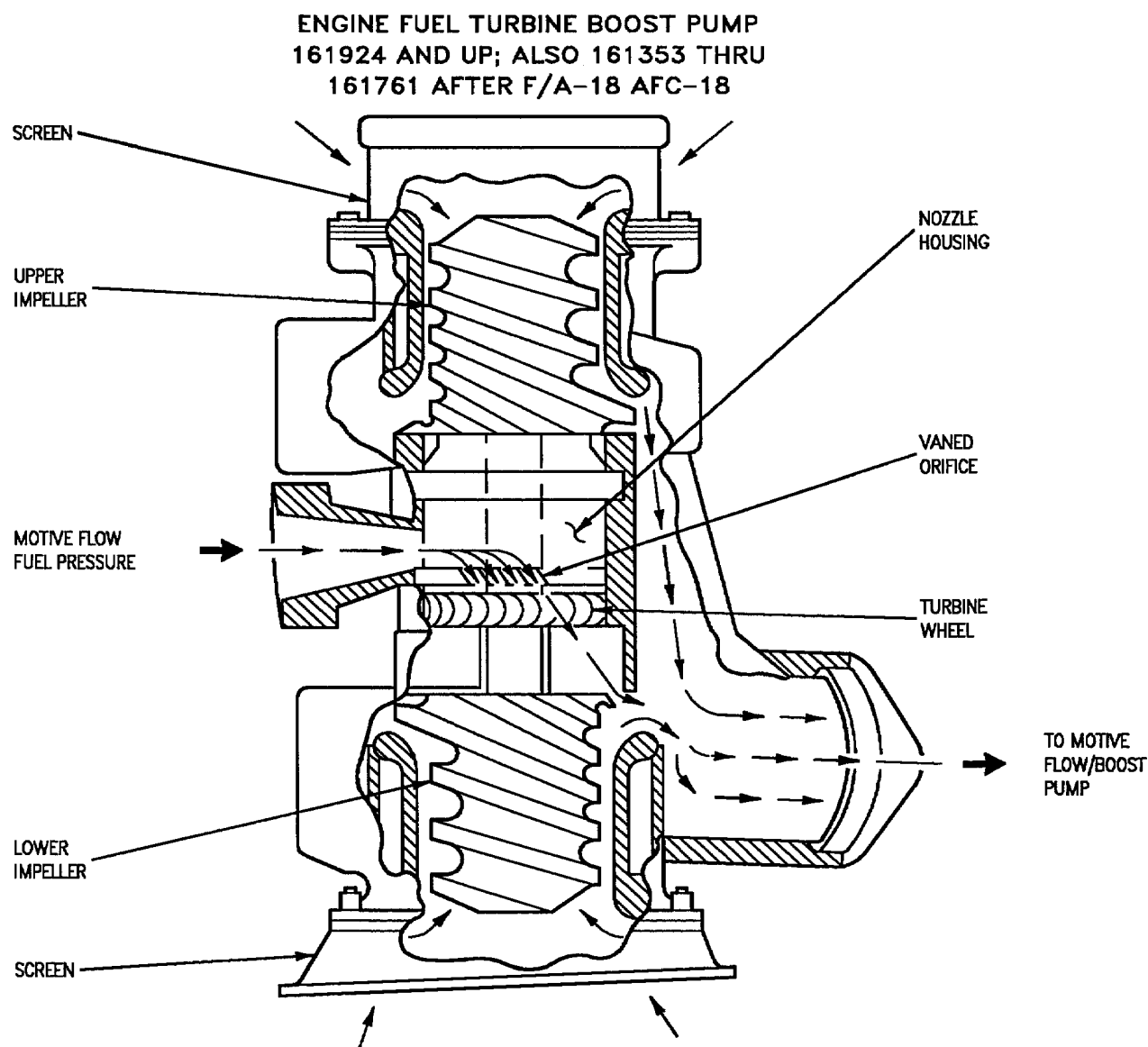
**INVERTED FLIGHT, ENGINE FEED**

OPERATION OF EJECTOR IS SAME AS DURING NORMAL FLIGHT EXCEPT THAT THE SHUTTLE VALVE CLOSES THE UPPER INLET TO PREVENT AIR INGESTION AND OPENS THE LOWER INLET ALLOWING TANK FUEL TO ENTER THE EJECTOR.



**ENGINE FUEL BOOST EJECTOR**  
**FUEL TANKS 2 & 3**

**Figure 1. Fuel System Component Operation (Sheet 27)**



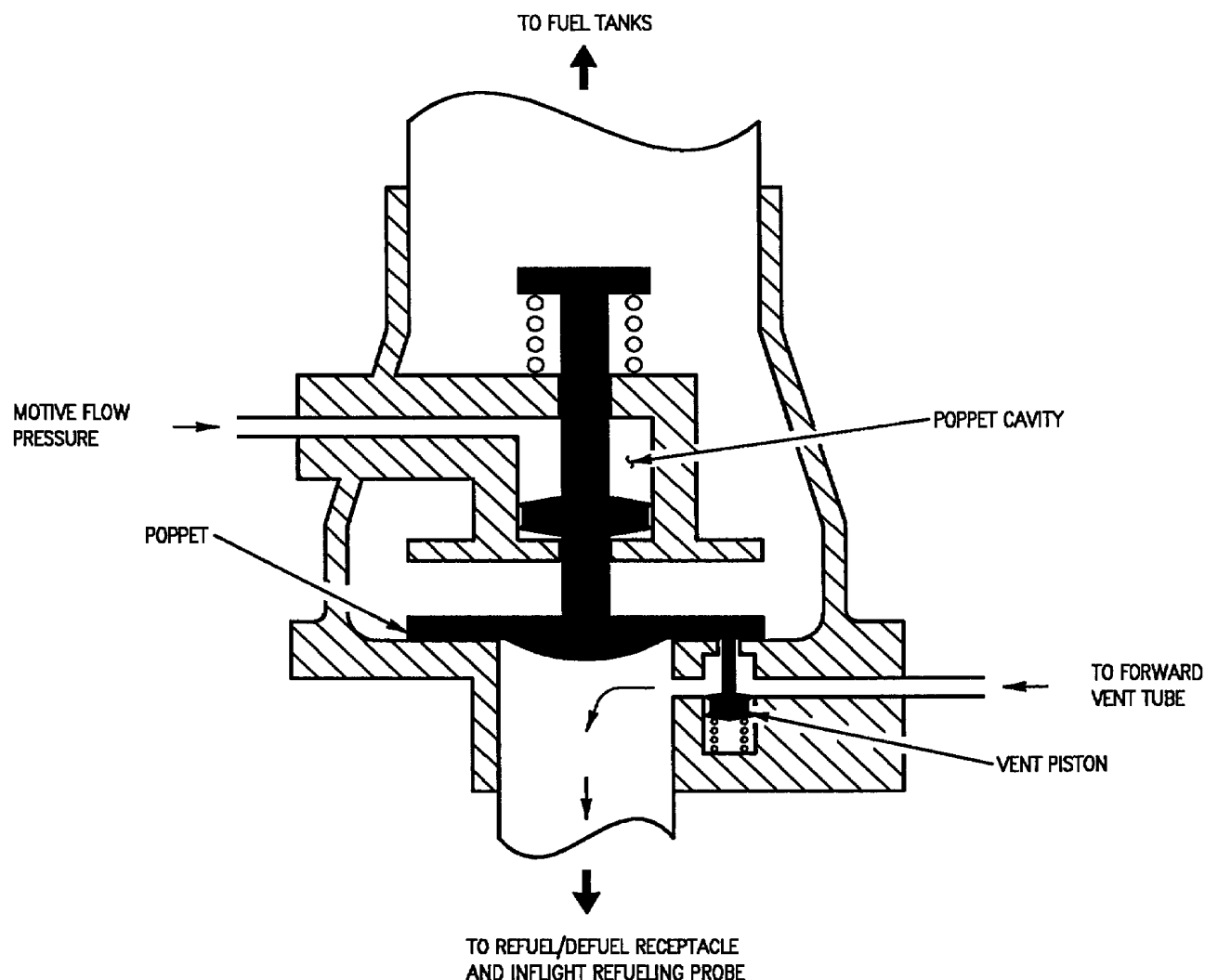
**ENGINE FUEL TURBINE BOOST PUMP  
NO.2 AND NO.3 FUEL TANKS**

THE ENGINE FUEL TURBINE BOOST PUMP IS HYDRAULICALLY DRIVEN BY FUEL FLOW DIRECTED AGAINST A SHAFT-MOUNTED TURBINE WHEEL. AT THE NOZZLE HOUSING, MOTIVE FLOW FUEL IS DIRECTED THROUGH A VANED ORIFICE WHICH TURNS THE TURBINE WHEEL. THE TURBINE WHEEL CONNECTS TO THE UPPER AND LOWER IMPELLERS BY A SHAFT. THE IMPELLERS DRAW FUEL FROM THE TANK AND MIX IT INSIDE THE PUMP WITH THE MOTIVE FLOW FUEL THAT TURNED THE TURBINE WHEEL. THE FUEL IS THEN DIRECTED OUT THE PUMP OUTLET TO THE MOTIVE FLOW/BOOST PUMP. SCREENS OVER THE INLETS PREVENT FOREIGN OBJECTS FROM ENTERING THE TURBINE PUMP. TURBINE BOOST PUMP OPERATION IS THE SAME FOR INVERTED OR NORMAL FLIGHT.

18AC-460-10-(35-28)23-CATI

**Figure 1. Fuel System Component Operation (Sheet 28)**

# REFUEL/DEFUEL SHUTOFF VALVE (40C132-2)



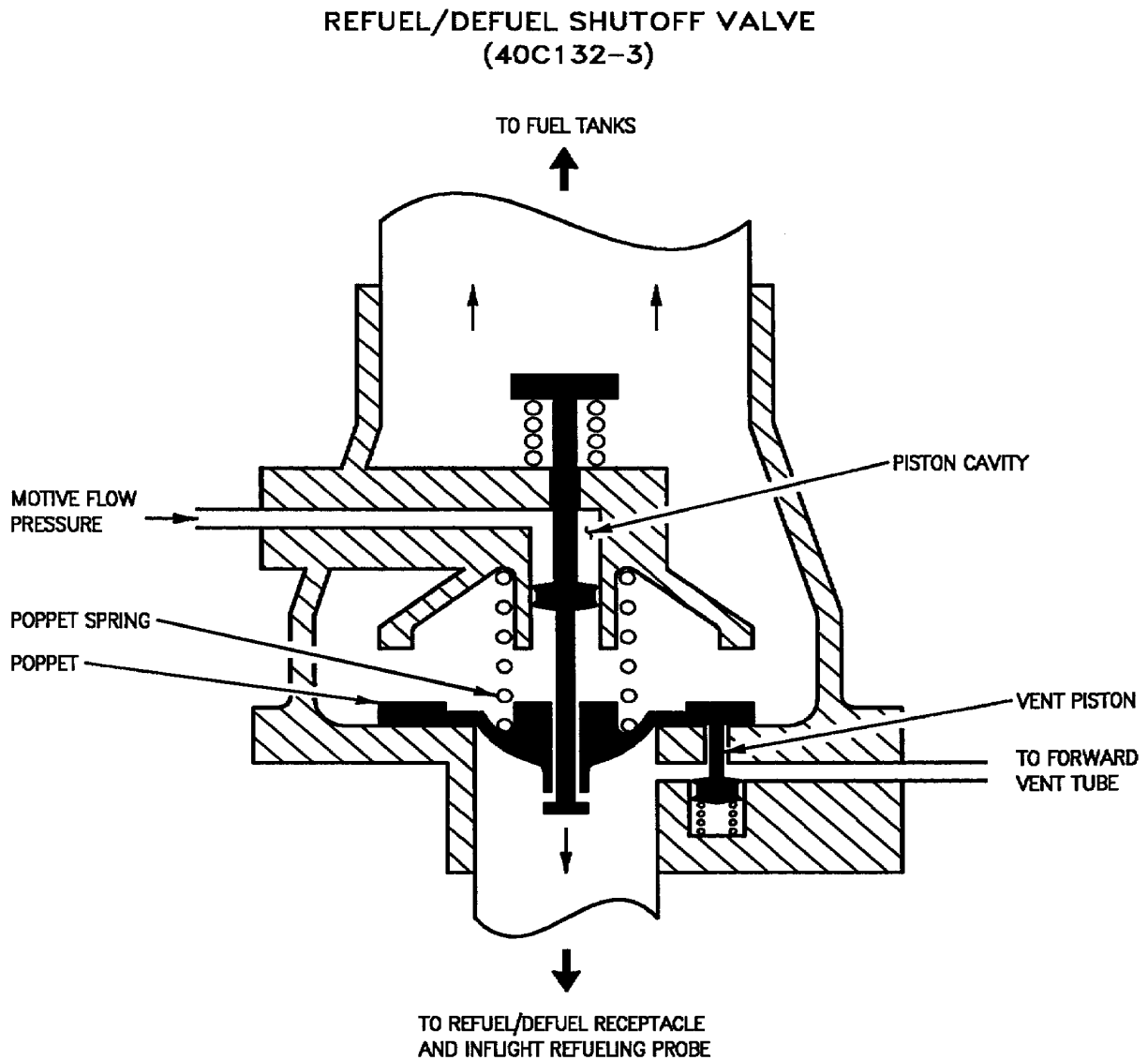
## WITH MOTIVE FLOW PRESSURE APPLIED

MOTIVE FLOW PRESSURE IS DIRECTED INTO POPPET CAVITY, OVER-riding POPPET SPRING PRESSURE, CAUSING THE POPPET TO CLOSE. AS THE POPPET CLOSSES, THE VENT PISTON IS OPENED, PROVIDING A VENT FOR SCAVENGE CONTROL VALVE WHICH ALLOWS ANY FUEL IN THE FORWARD VENT TUBE AND REFUEL/DEFUEL LINE TO BE SCAVENGED. DURING INFLIGHT REFUELING OR REFUELING WITH ENGINES OPERATING, REFUEL PRESSURE APPLIED AGAINST THE POPPET OVER-rides MOTIVE FLOW PRESSURE INSIDE POPPET CAVITY AND OPENS POPPET. WHEN POPPET OPENS, VENT PISTON CLOSES VENT PATH TO FORWARD VENT TUBE PREVENTING FUEL FROM ENTERING VENT SYSTEM.

18AC-460-10-(35-29)H-CATI

Figure 1. Fuel System Component Operation (Sheet 29)





### WITH MOTIVE FLOW PRESSURE APPLIED

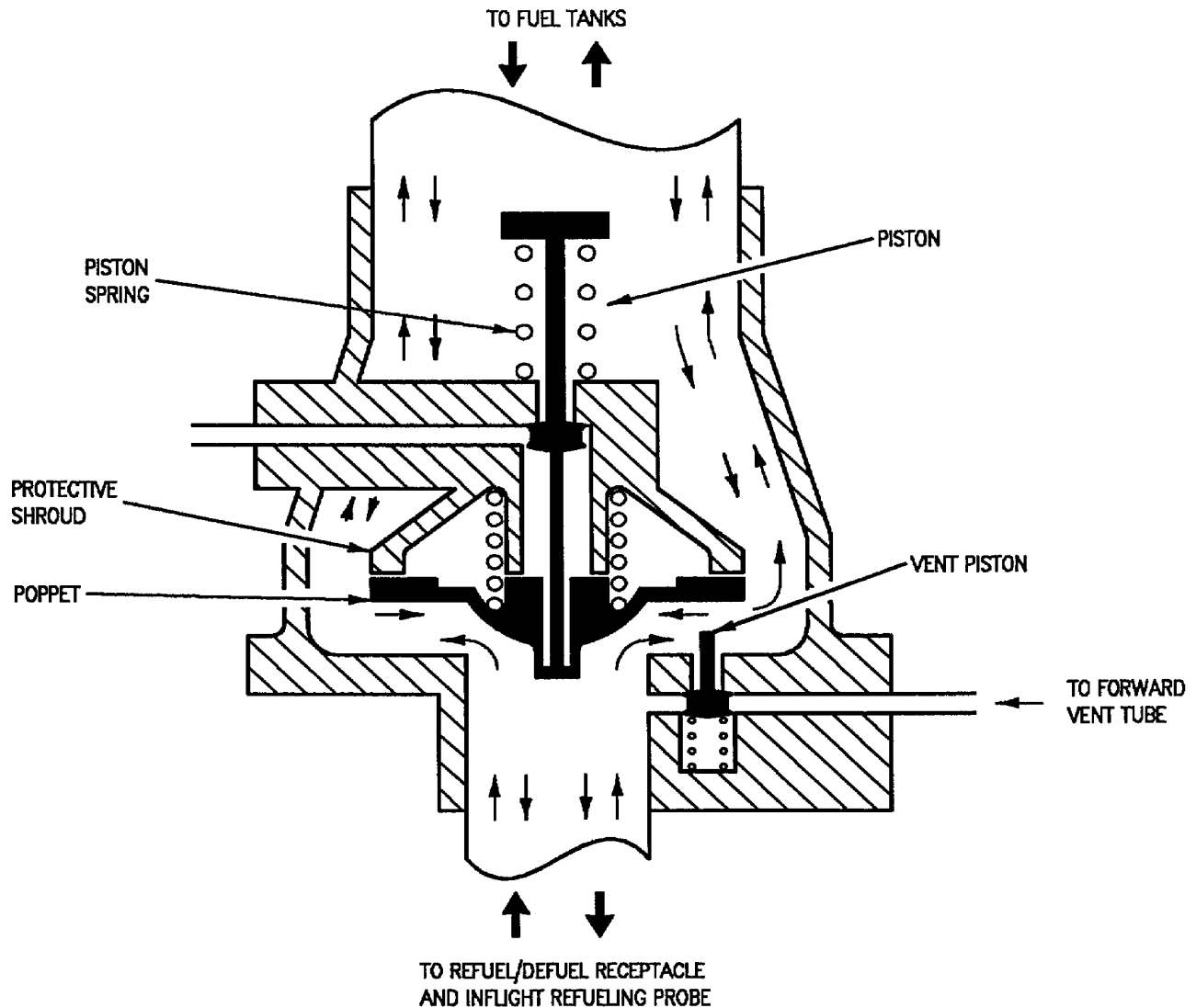
MOTIVE FLOW PRESSURE DIRECTED INTO THE PISTON CAVITY EXTENDS THE PISTON AND ALLOWS THE POPPET SPRING TO CLOSE THE POPPET. WHEN THE POPPET CLOSSES, THE VENT PISTON OPENS TO PROVIDE A VENT FOR FUEL SCAVENGE OF THE VENT TUBE AND REFUEL/DEFUEL MANIFOLD.

DURING INFLIGHT REFUELING OR REFUELING WITH ENGINES OPERATING, REFUEL PRESSURE APPLIED TO THE POPPET OVERRIDES POPPET SPRING PRESSURE AND OPENS THE POPPET. WHEN THE POPPET OPENS, THE VENT PISTON CLOSSES AND PREVENTS FUEL FROM ENTERING THE VENT SYSTEM.

18AC-460-10-(35-30)20-CATI

**Figure 1. Fuel System Component Operation (Sheet 30)**

# REFUEL/DEFUEL SHUTOFF VALVE (40C132-3)

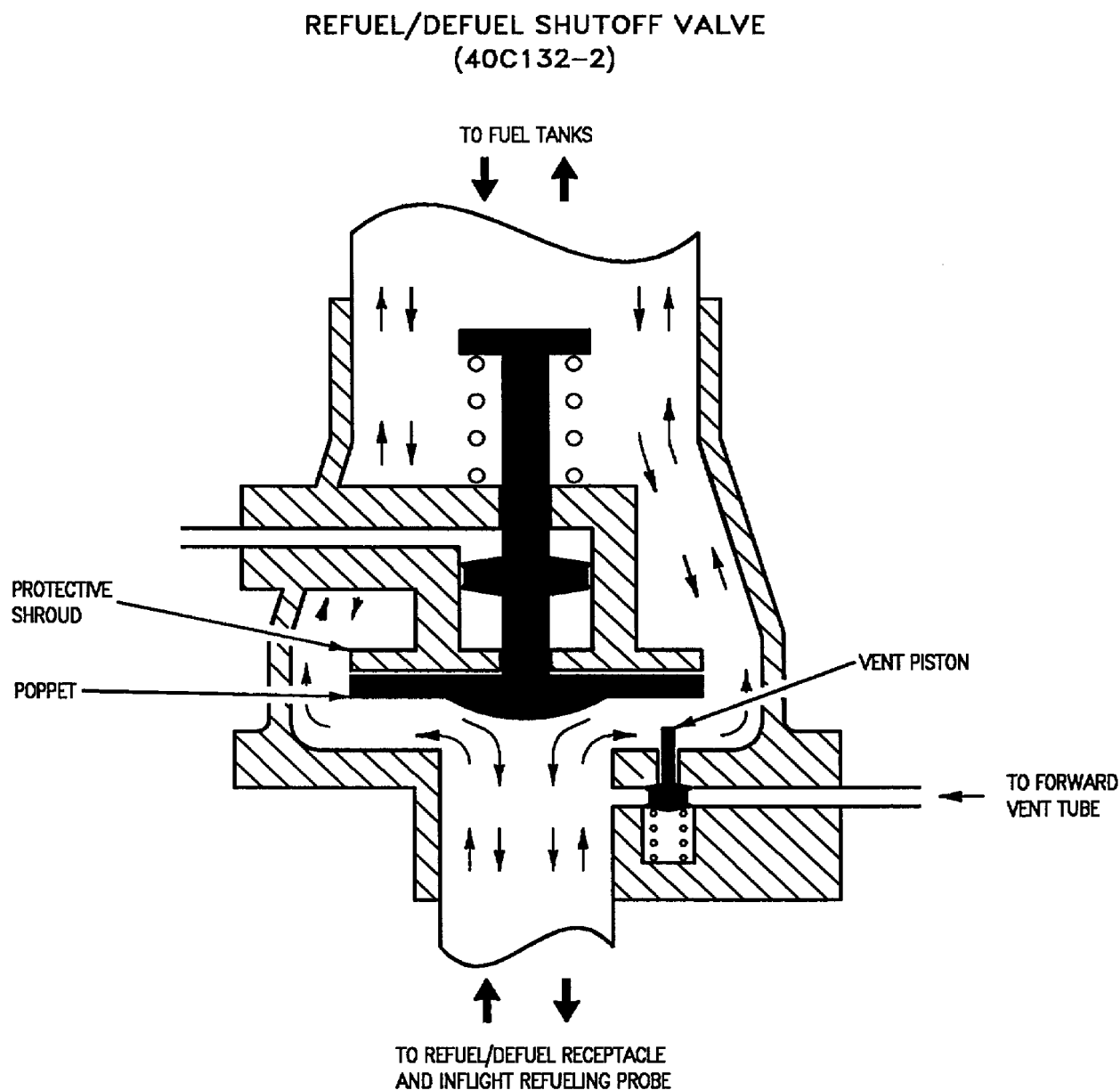


## REFUEL/DEFUEL

WHEN MOTIVE FLOW PRESSURE IS NOT APPLIED, PISTON SPRING RETRACTS PISTON AND OPENS THE POPPET. DURING REFUEL, FUEL FLOWS AROUND THE POPPET AND TO THE FUEL TANKS. WHEN DEFUELING, THE PROTECTIVE SHROUD PREVENTS SUCTION PRESSURE FROM CLOSING POPPET. SPRING PRESSURE CLOSSES VENT PISTON PREVENTING FUEL FLOW TO FORWARD VENT TUBE.

18AC-460-10-(35-31)20-CATI

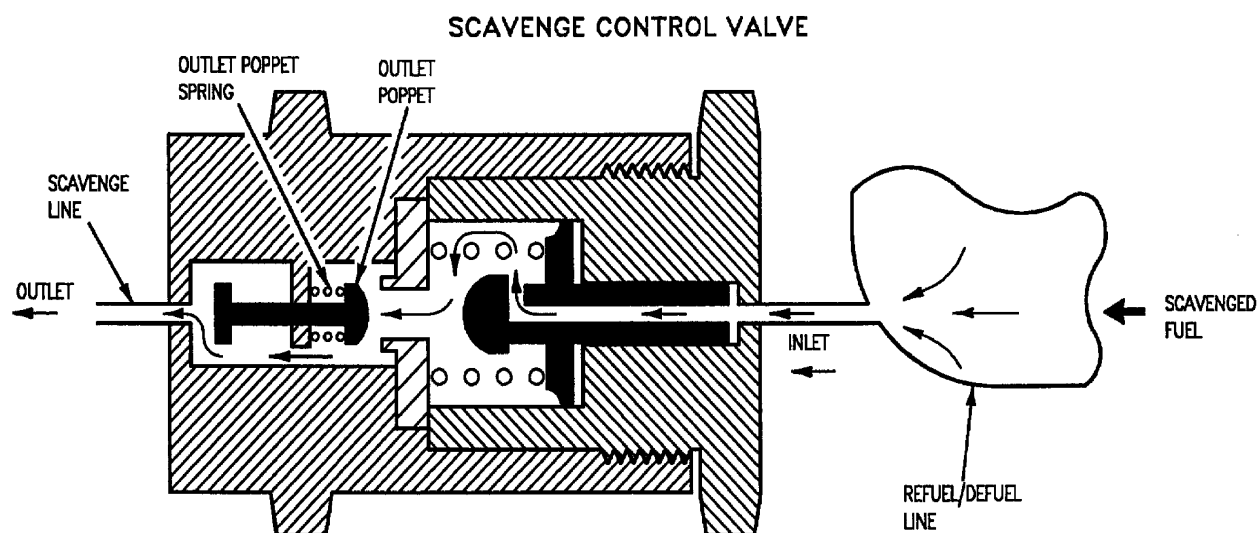
Figure 1. Fuel System Component Operation (Sheet 31)



WHEN MOTIVE FLOW PRESSURE IS NOT APPLIED, POPPET SPRING PRESSURE OPENS POPPET AGAINST THE PROTECTIVE SHROUD AND SPRING PRESSURE CLOSES THE VENT PISTON, ALLOWING FUEL FLOW THROUGH REFUEL/DEFUEL SHUTOFF VALVE. THE PROTECTIVE SHROUD PREVENTS FUEL PRESSURE FROM CLOSING POPPET DURING DEFUELING AND VENT PISTON PREVENTS REFUEL/DEFUEL PRESSURE FROM ENTERING THE FORWARD VENT TUBE.

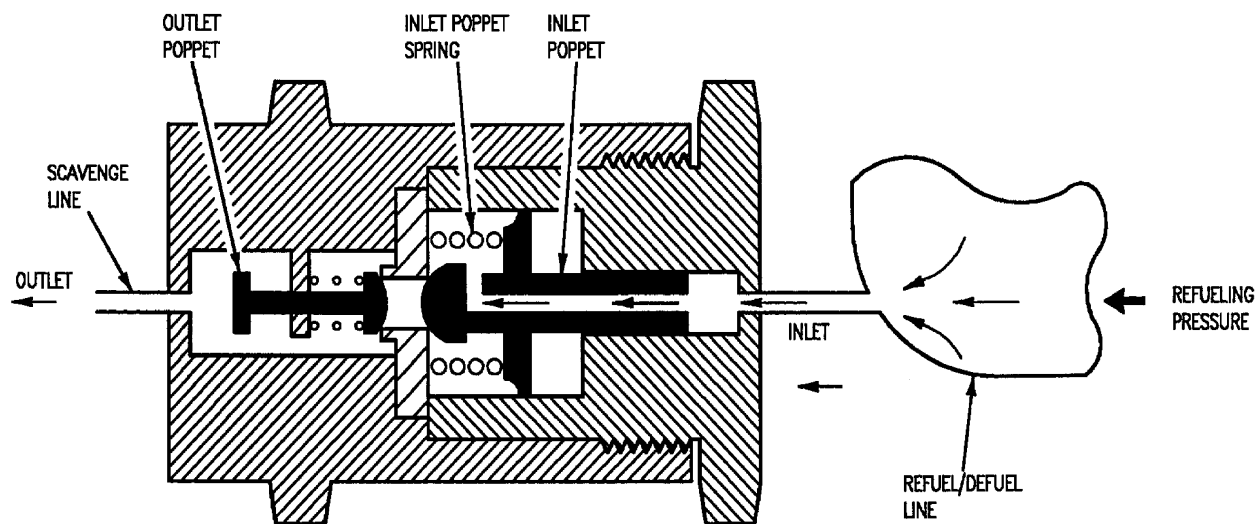
18AC-460-10-(35-32)20-CATI

Figure 1. Fuel System Component Operation (Sheet 32)



### ENGINE OPERATING

WITH ENGINES OPERATING, SUCTION PRESSURE FROM THE REFUELING MANIFOLD SCAVENGE JET EJECTOR (INSIDE NO. 2 FUEL TANK) OVERRIDES OUTLET POPPET SPRING PRESSURE AND OPENS OUTLET POPPET, ALLOWING FUEL TO BE SCAVENGED FROM THE REFUEL/DEFUEL LINE. DURING SCAVENGE, FUEL IN THE REFUEL/DEFUEL LINE IS VENTED THROUGH VENT PORT IN THE REFUEL/DEFUEL SHUTOFF VALVE.

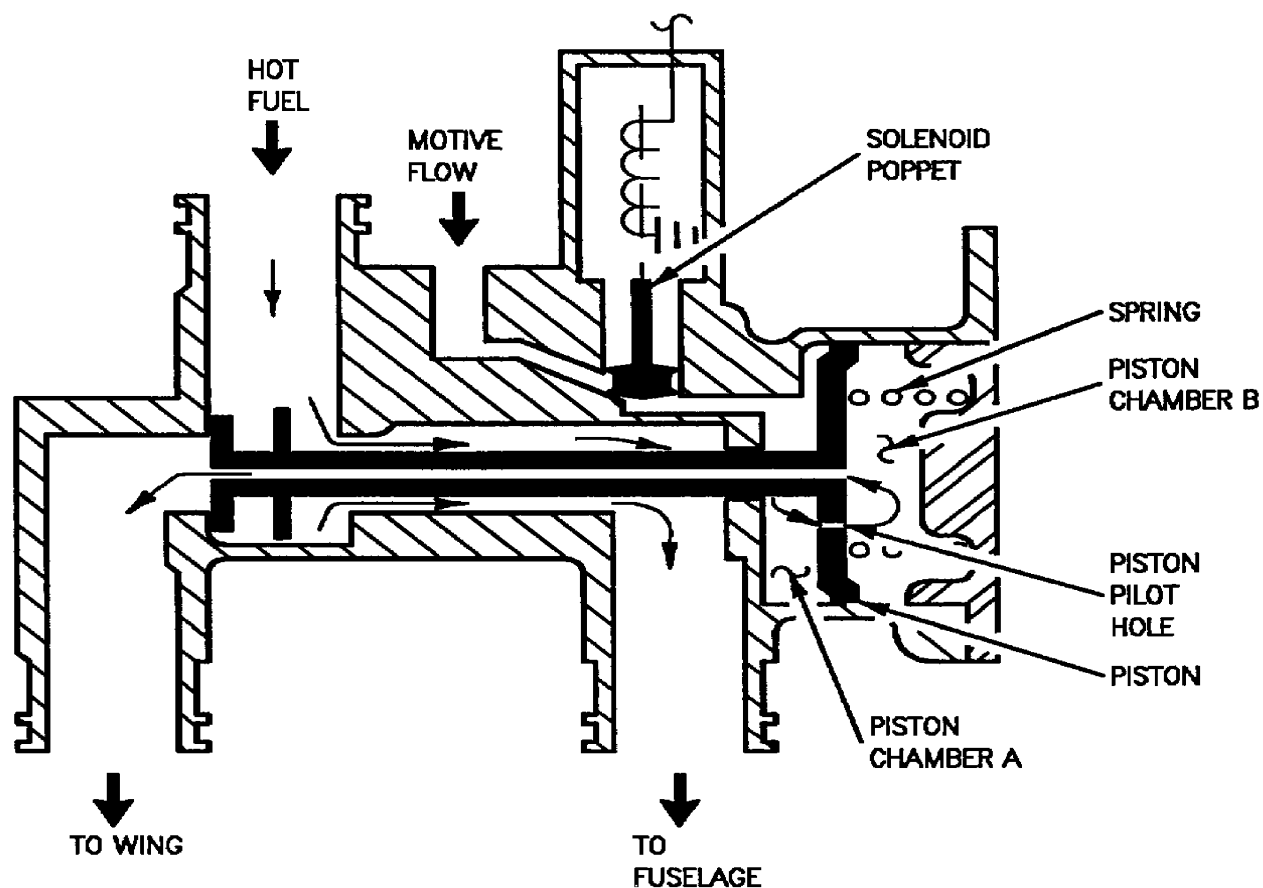


### REFUEL/DEFUEL

WHEN REFUEL PRESSURE IS APPLIED, FUEL PRESSURE OVERRIDES INLET POPPET SPRING PRESSURE, CLOSING INLET POPPET AND PREVENTING REFUELING PRESSURE FROM ENTERING SCAVENGE LINE. DURING DEFUEL, THE OUTLET POPPET PREVENTS AIR FROM ENTERING THE REFUEL/DEFUEL LINE.

**Figure 1. Fuel System Component Operation (Sheet 33)**

## DIVERTER VALVE

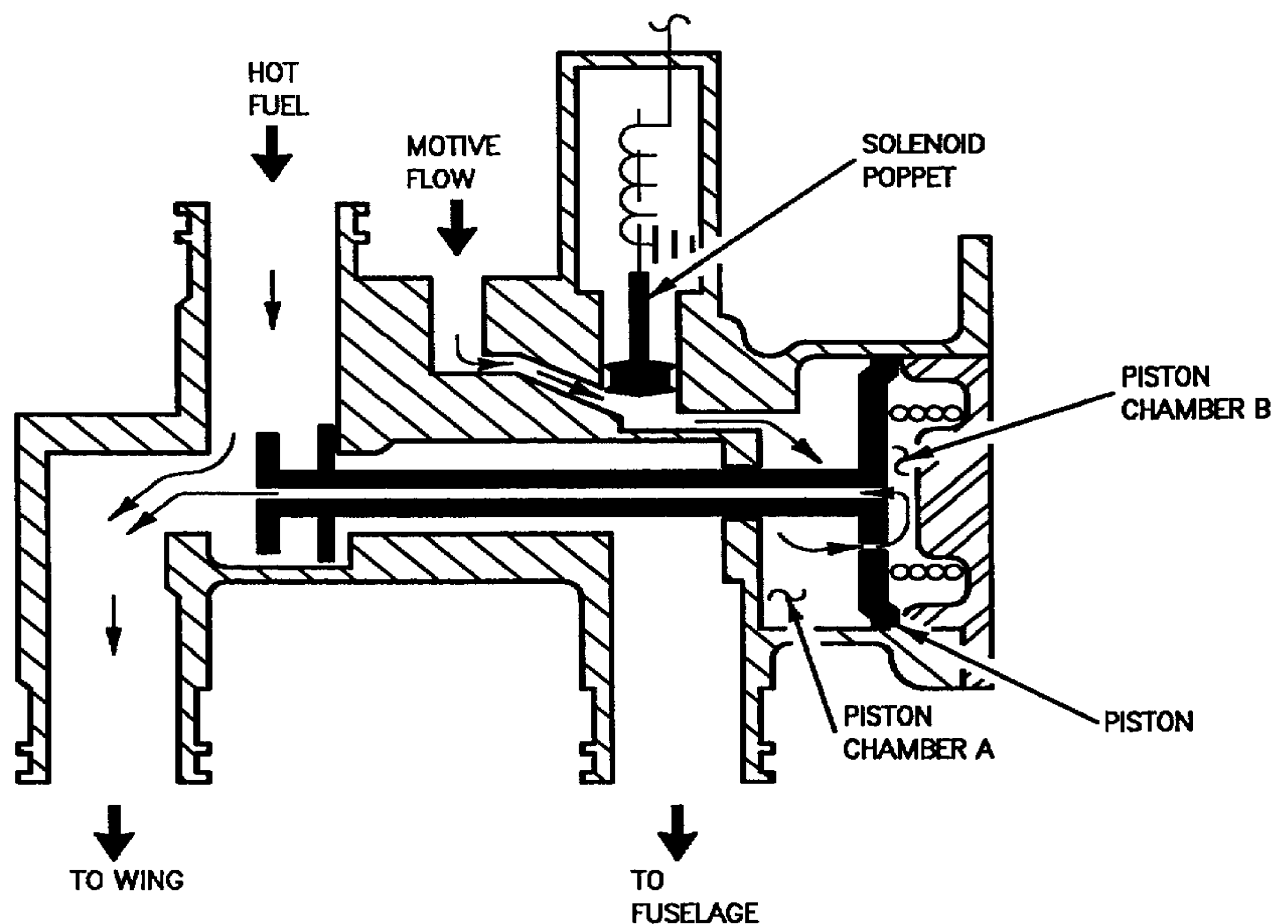


## DIVERTING TO FUSELAGE

WHEN DEENERGIZED, THE SOLENOID POPPET CLOSES, PREVENTING MOTIVE FLOW PRESSURE FROM ENTERING PISTON CHAMBER A. THE SPRING IN PISTON CHAMBER B APPLIES PRESSURE TO PISTON, FORCING FUEL IN PISTON CHAMBER A THROUGH THE PISTON PILOT HOLE INTO CHAMBER B. AS FUEL AMOUNT IN CHAMBER A DECREASES, SPRING PRESSURE POSITIONS PISTON TO DIVERT FUEL TO THE FUSELAGE.

Figure 1. Fuel System Component Operation (Sheet 34)

## DIVERTER VALVE



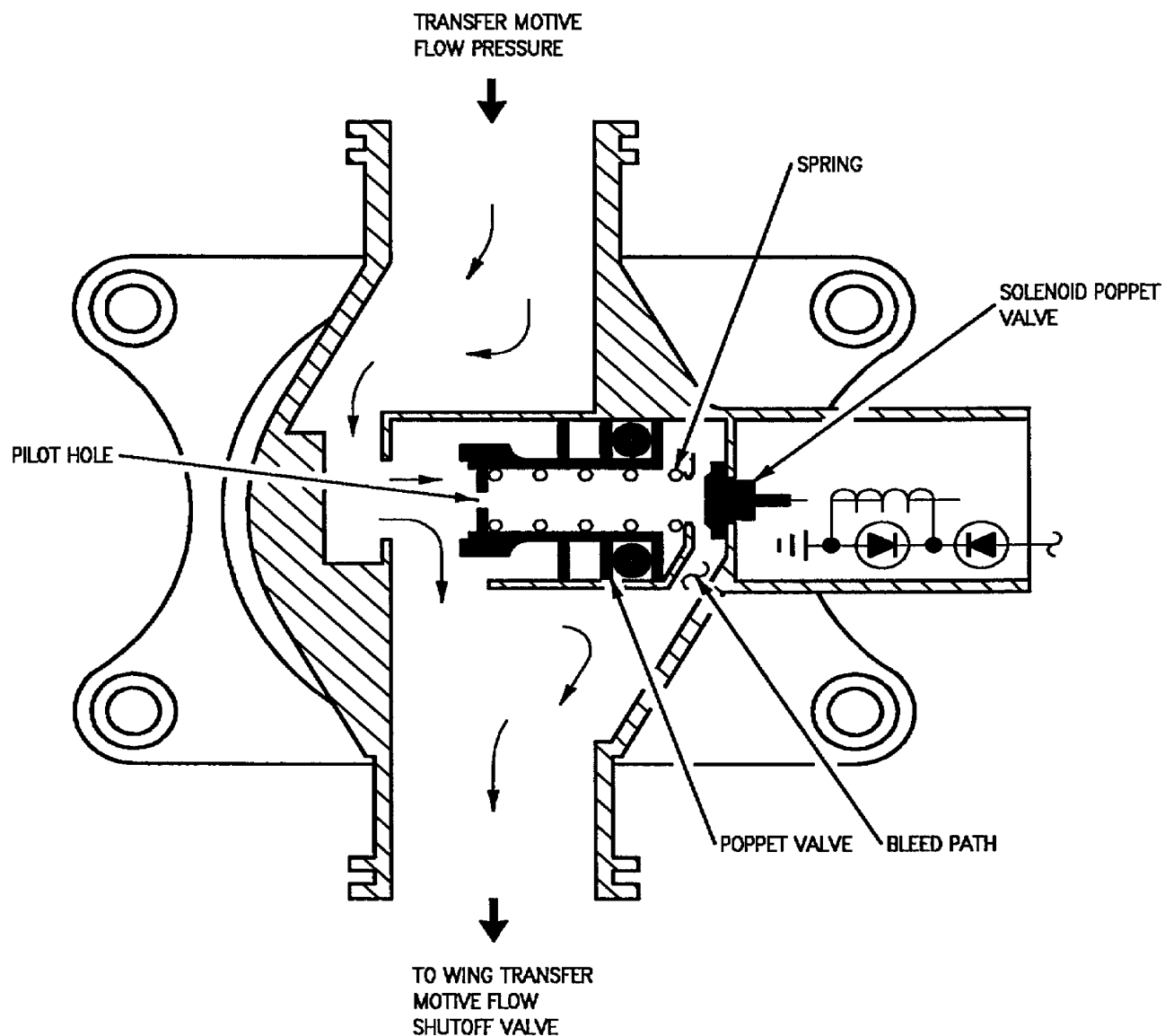
## DIVERTING TO WING

WHEN ENERGIZED, THE SOLENOID POPPET OPENS, ALLOWING MOTIVE FLOW PRESSURE TO ENTER PISTON CHAMBER A. THE SPRING IS COMPRESSED CAUSING FUEL IN PISTON CHAMBER B TO RELIEVE THROUGH THE PISTON CENTER. AS CHAMBER B FUEL RELIEVES, PISTON IS POSITIONED TO DIVERT FUEL TO THE WING TANK.

18AC-460-10-(35-35)H-CATI

Figure 1. Fuel System Component Operation (Sheet 35)

## WING DAMAGE SHUTOFF VALVE

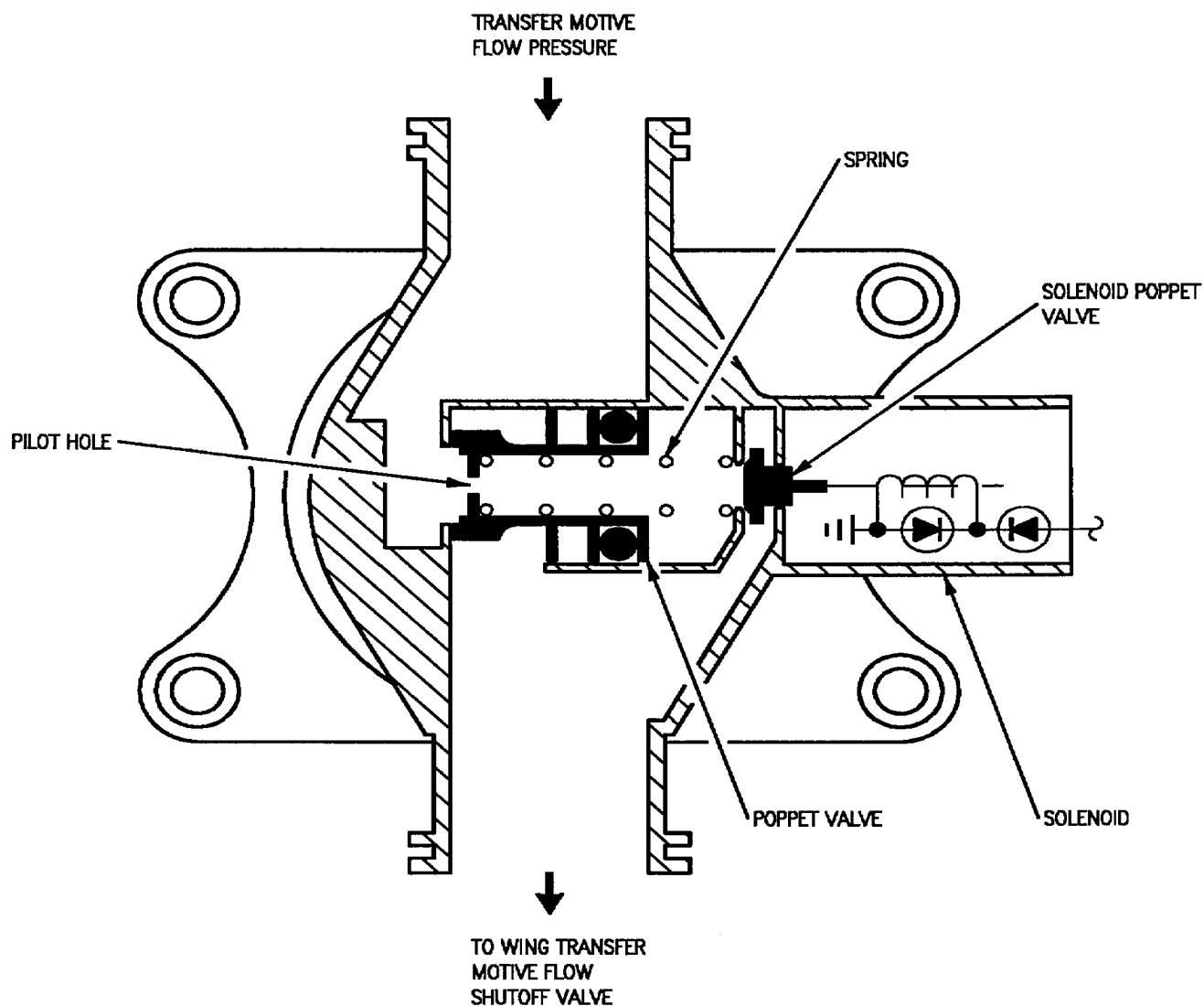


## WING TRANSFER

THE DEENERGIZED SOLENOID POPPET VALVE PROVIDES PRESSURE RELIEF FOR FUEL ENTERING PILOT HOLE. TRANSFER MOTIVE FLOW PRESSURE AGAINST POPPET VALVE OVERCOMES SPRING PRESSURE. POPPET VALVE OPENS AND FUEL FLOWS TO WING.

Figure 1. Fuel System Component Operation (Sheet 36)

## WING DAMAGE SHUTOFF VALVE



## STOP WING TRANSFER (INHIBIT)

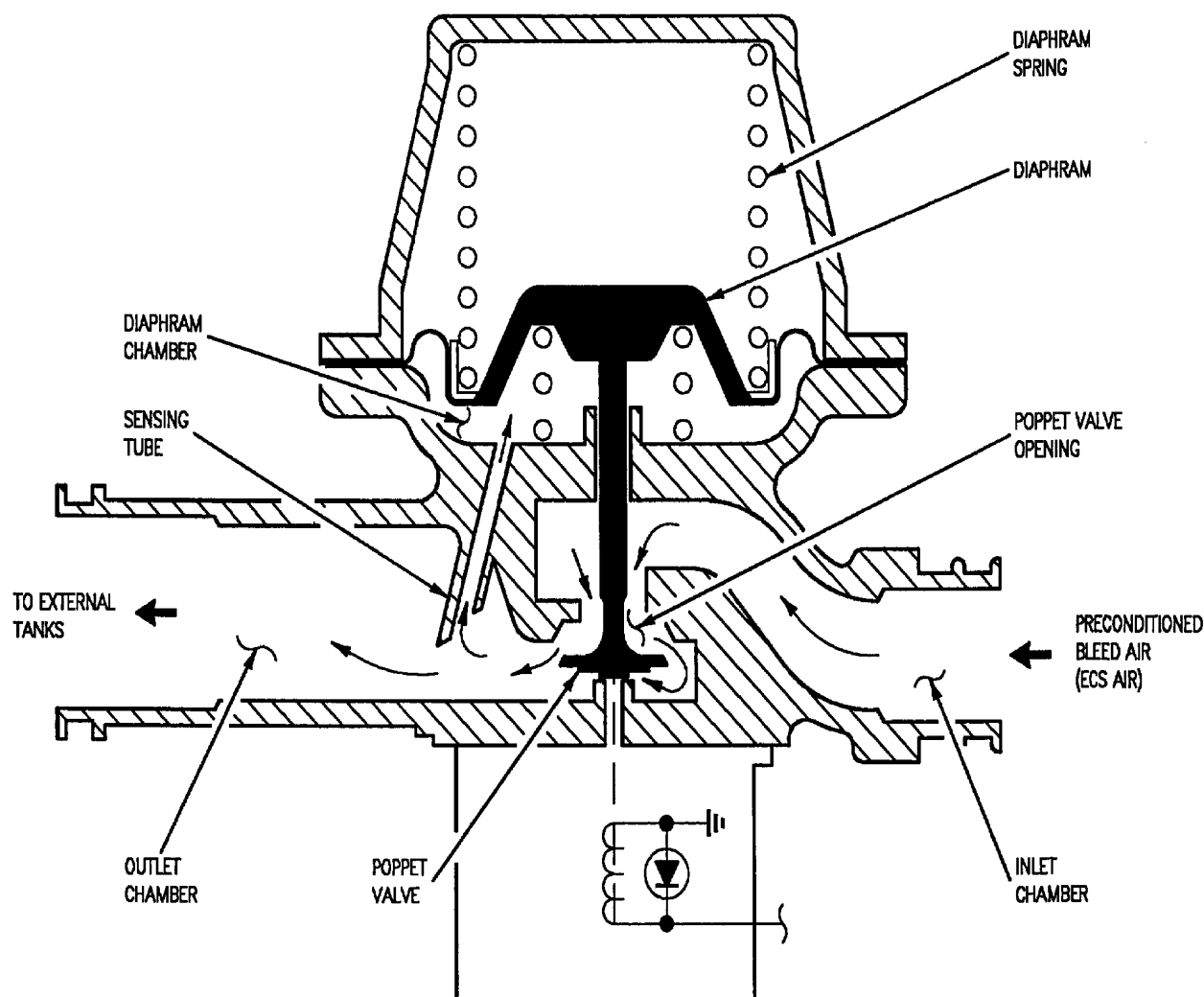
WHEN ENERGIZED, SOLENOID POPPET VALVE CLOSES. FUEL FLOW THROUGH PILOT HOLE IS NO LONGER RELIEVED. FUEL PRESSURE INSIDE THE POPPET VALVE EQUALIZES WITH TRANSFER MOTIVE FLOW PRESSURE AT INLET. THE STATIC PRESSURE AREA INSIDE THE POPPET VALVE IS GREATER THAN THE AREA OUTSIDE THE POPPET VALVE AT THE INLET. THE STATIC PRESSURE AND SPRING PRESSURE CLOSE THE POPPET VALVE STOPPING WING TRANSFER.

18AC-460-10-(35-37)H-CATI

Figure 1. Fuel System Component Operation (Sheet 37)



## EXTERNAL TANKS AIR PRESSURE REGULATOR



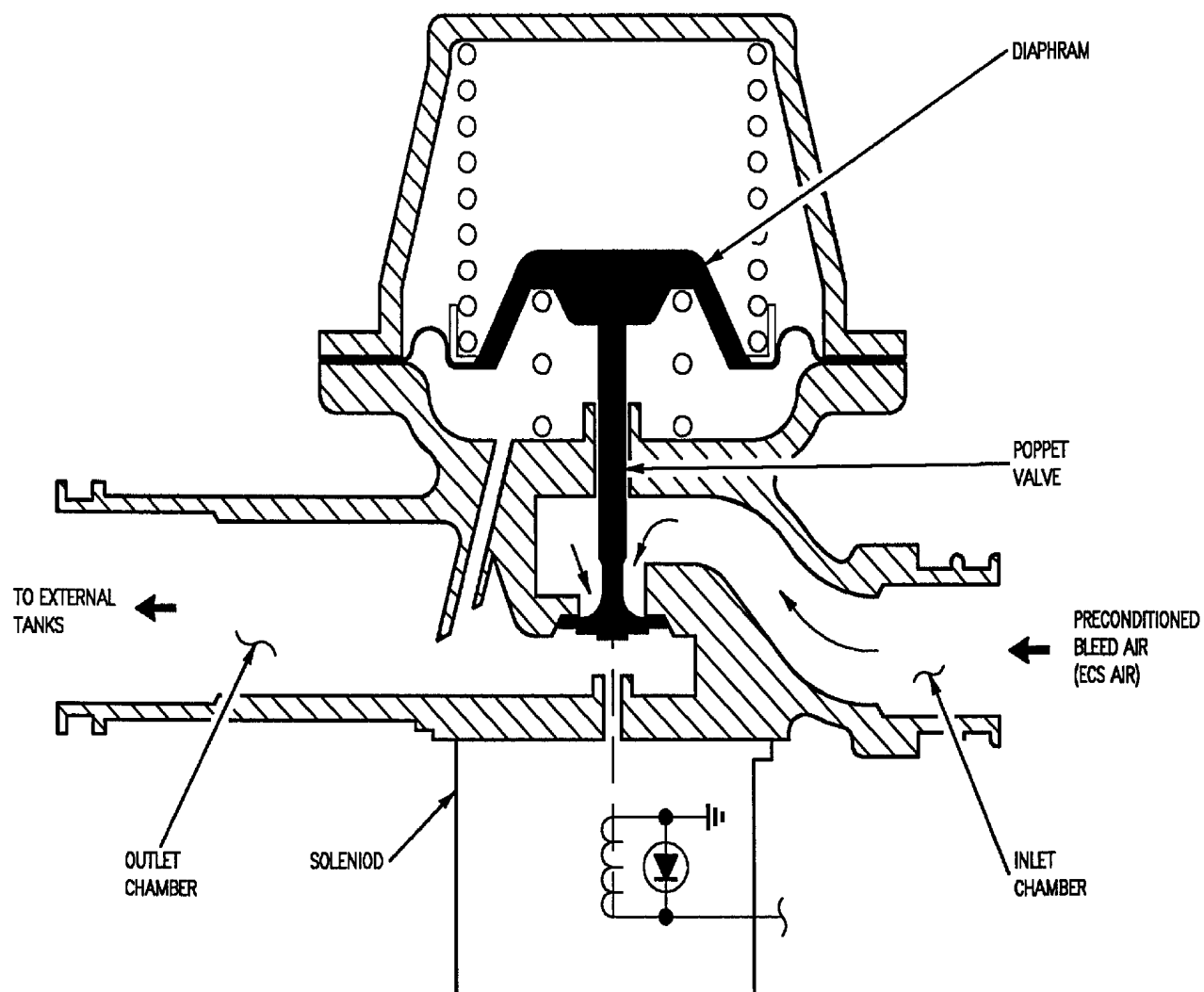
## EXTERNAL FUEL TANK PRESSURATION

ECS AIR PRESSURE FLOWS FROM INLET CHAMBER TO OUTLET CHAMBER. SENSING TUBE EQUALIZES DIAPHRAM CHAMBER AND OUTLET CHAMBER AIR PRESSURE. AS DIAPHRAM CHAMBER AND OUTLET CHAMBER AIR PRESSURE INCREASES, THE DIAPHRAM COMPRESSES THE DIAPHRAM SPRING AND PARTIALLY OR COMPLETELY CLOSES THE POPPET VALVE. WHEN DIAPHRAM CHAMBER AND OUTLET CHAMBER AIR PRESSURE DECREASES, DIAPHRAM SPRING OPENS THE POPPET VALVE AND INCREASES AIR FLOW.

18AC-460-10-(35-38)H-CATI

Figure 1. Fuel System Component Operation (Sheet 38)

## EXTERNAL TANKS AIR PRESSURE REGULATOR

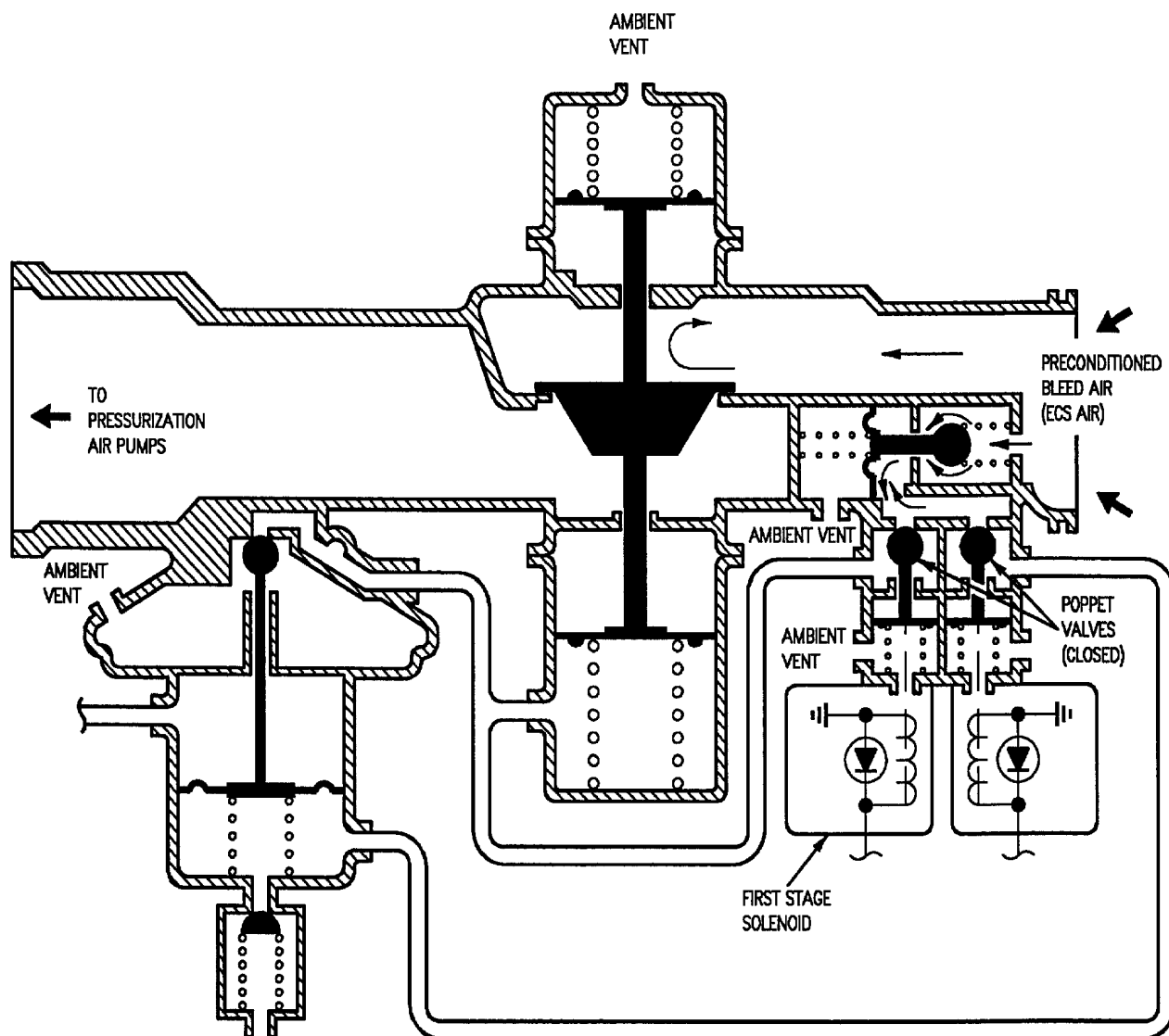


WEIGHT ON WHEELS, HOOK CONTROL HANDLE DOWN OR  
INFLIGHT REFUELING PROBE EXTENDED

WHEN ENERGIZED, POPPET VALVE CLOSES STOPPING AIR FLOW TO  
EXTERNAL FUEL TANK(S).

Figure 1. Fuel System Component Operation (Sheet 39)

## INTERNAL TANKS AIR PRESSURE REGULATOR

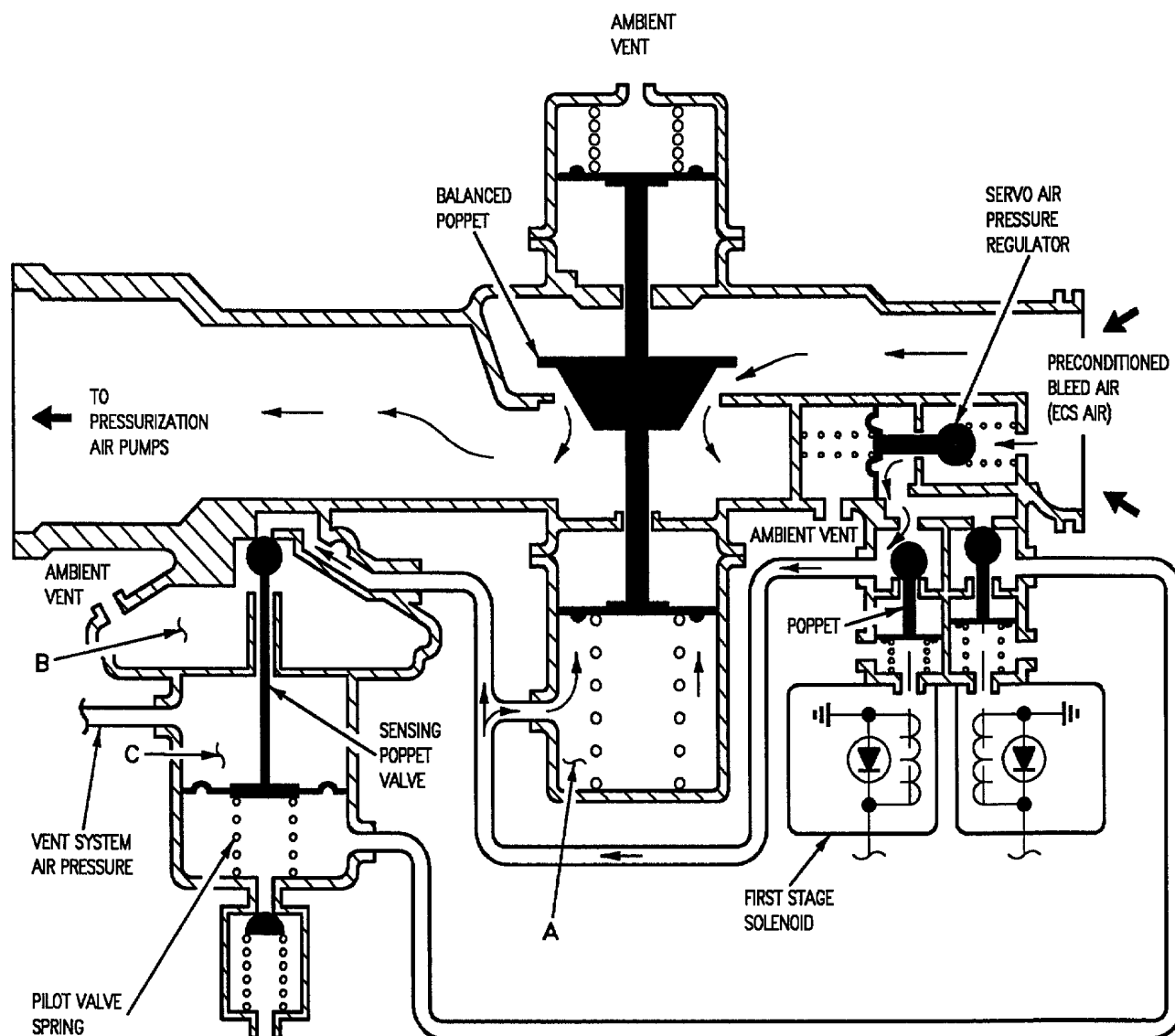


WEIGHT ON WHEELS OR INFLIGHT WITH  
INFLIGHT REFUELING PROBE EXTENDED  
OR ARRESTING GEAR HANDLE DOWN

FIRST STAGE REGULATING SOLENOID IS DEENERGIZED.  
NO ECS AIR FLOW IS PERMITTED THROUGH REGULATOR.

Figure 1. Fuel System Component Operation (Sheet 40)

## INTERNAL TANKS AIR PRESSURE REGULATOR



## INFLIGHT BELOW 20,000 FEET

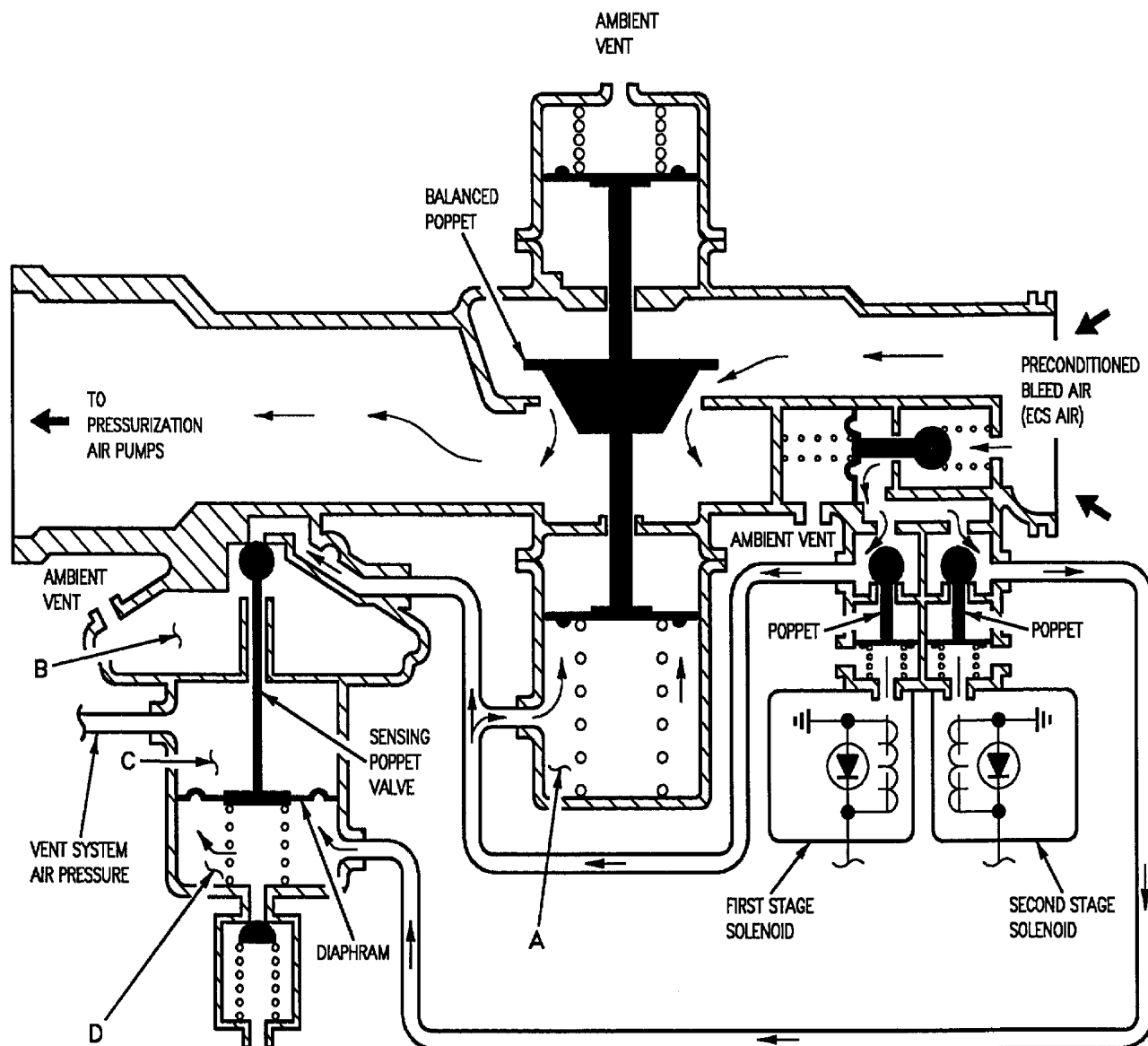
WHEN ENERGIZED, THE FIRST STAGE SOLENOID POPPET ALLOWS ECS AIR TO CHAMBER A AND CHAMBER B. WHEN VENT SYSTEM AIR PRESSURE IN CHAMBER C IS GREATER THAN 0.7 PSI, THE PILOT VALVE SPRING COMPRESSES AND THE SENSING POPPET VALVE OPENS. AS SENSING POPPET VALVE OPENS, AIR PRESSURE ENTERS CHAMBER B AND RELIEVES TO THE ATMOSPHERE. WHEN VENT SYSTEM AIR PRESSURE IN CHAMBER C DECREASES TO LESS THAN 0.4 PSI, THE PILOT VALVE SPRING CLOSSES THE SENSING POPPET VALVE. AIR

PRESSURE CAN NO LONGER RELIEVE THROUGH CHAMBER B, CAUSING AIR PRESSURE TO INCREASE IN CHAMBER A. SPRING PRESSURE AND AIR PRESSURE OPENS THE BALANCED POPPET, ALLOWING ECS AIR TO THE PRESSURIZATION AIR PUMP.

THE SERVO AIR PRESSURE REGULATOR CLOSURES DURING SUDDEN ECS AIR PRESSURE SURGES, PREVENTING RAPID OPENING AND CLOSING OF THE BALANCED POPPET VALVE.

Figure 1. Fuel System Component Operation (Sheet 41)

## INTERNAL TANKS AIR PRESSURE REGULATOR



ABOVE 20,000 FEET OR WHEN VERTICAL LOAD IS NEGATIVE

WHEN ENERGIZED OPEN, THE SECOND STAGE SOLENOID ALLOWS ECS AIR TO ALSO ENTER CHAMBER D AND INCREASE PRESSURE ON THE DIAPHRAM. WHEN VENT SYSTEM AIR PRESSURE IN CHAMBER C IS BELOW 2.5 PSI, SPRING PRESSURE AND AIR PRESSURE IN CHAMBER D CLOSE THE SENSING POPPET VALVE. AIR PRESSURE ENTERING

CHAMBER A CAN NO LONGER RELIEVE TO CHAMBER B, CAUSING THE BALANCED POPPET TO OPEN. WHEN VENT SYSTEM AIR PRESSURE IN CHAMBER C IS ABOVE 3.5 PSI, THE SENSING POPPET VALVE OPENS AND ECS AIR RELIEVES TO THE ATMOSPHERE CAUSING THE BALANCED POPPET VALVE TO CLOSE.

Figure 1. Fuel System Component Operation (Sheet 42)



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**ORGANIZATIONAL MAINTENANCE**  
**PRINCIPLES OF OPERATION**  
**COMPONENT LOCATOR**  
**FUEL SYSTEM/FUEL STORAGE SYSTEM**

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**Reference Material**

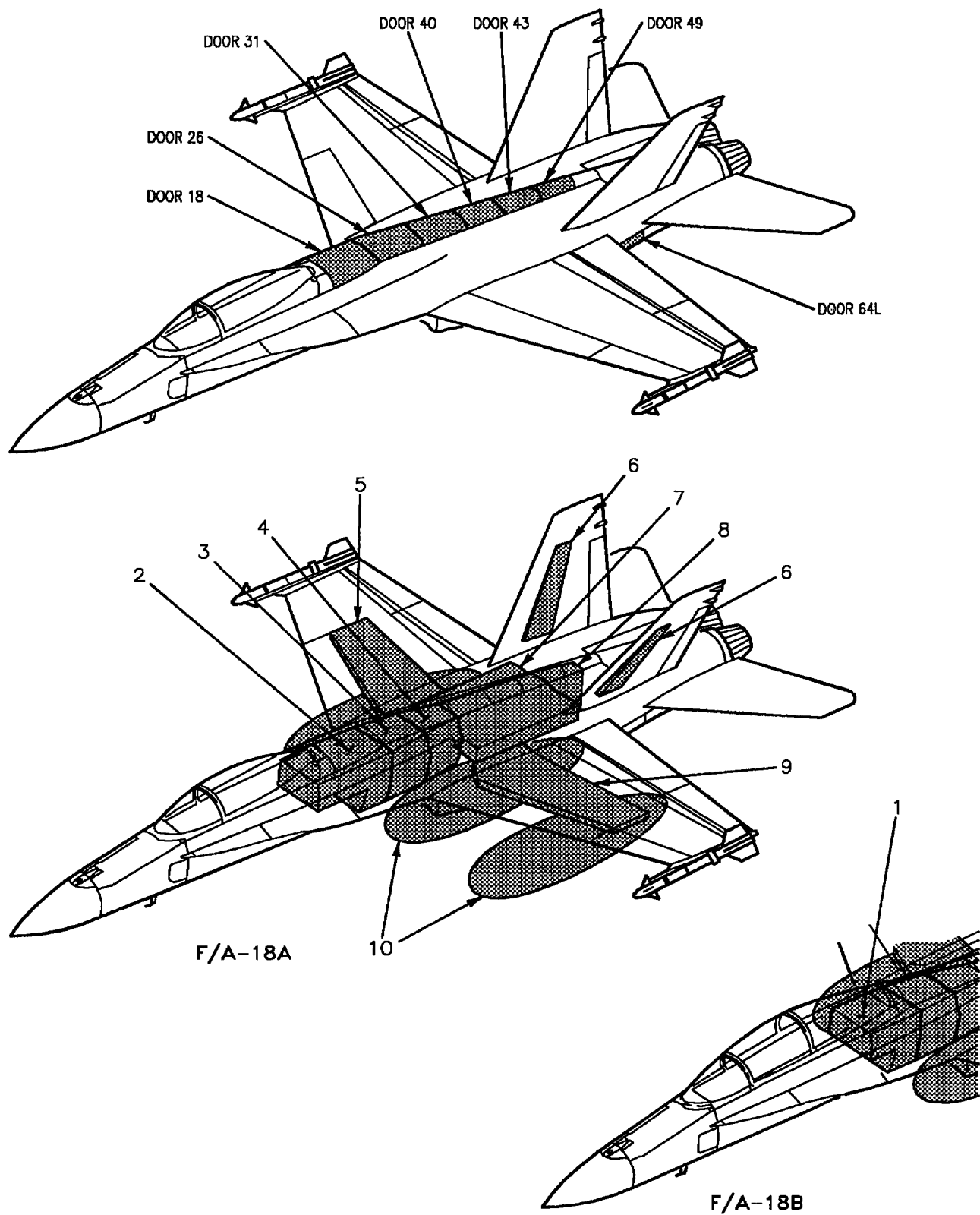
None

**Alphabetical Index**

<b>Subject</b>	<b>Page No.</b>
Fuel Storage System Component Locator, Figure 1 .....	2
Fuel System Controls and Indicators, Figure 2 .....	6

**Record of Applicable Technical Directives**

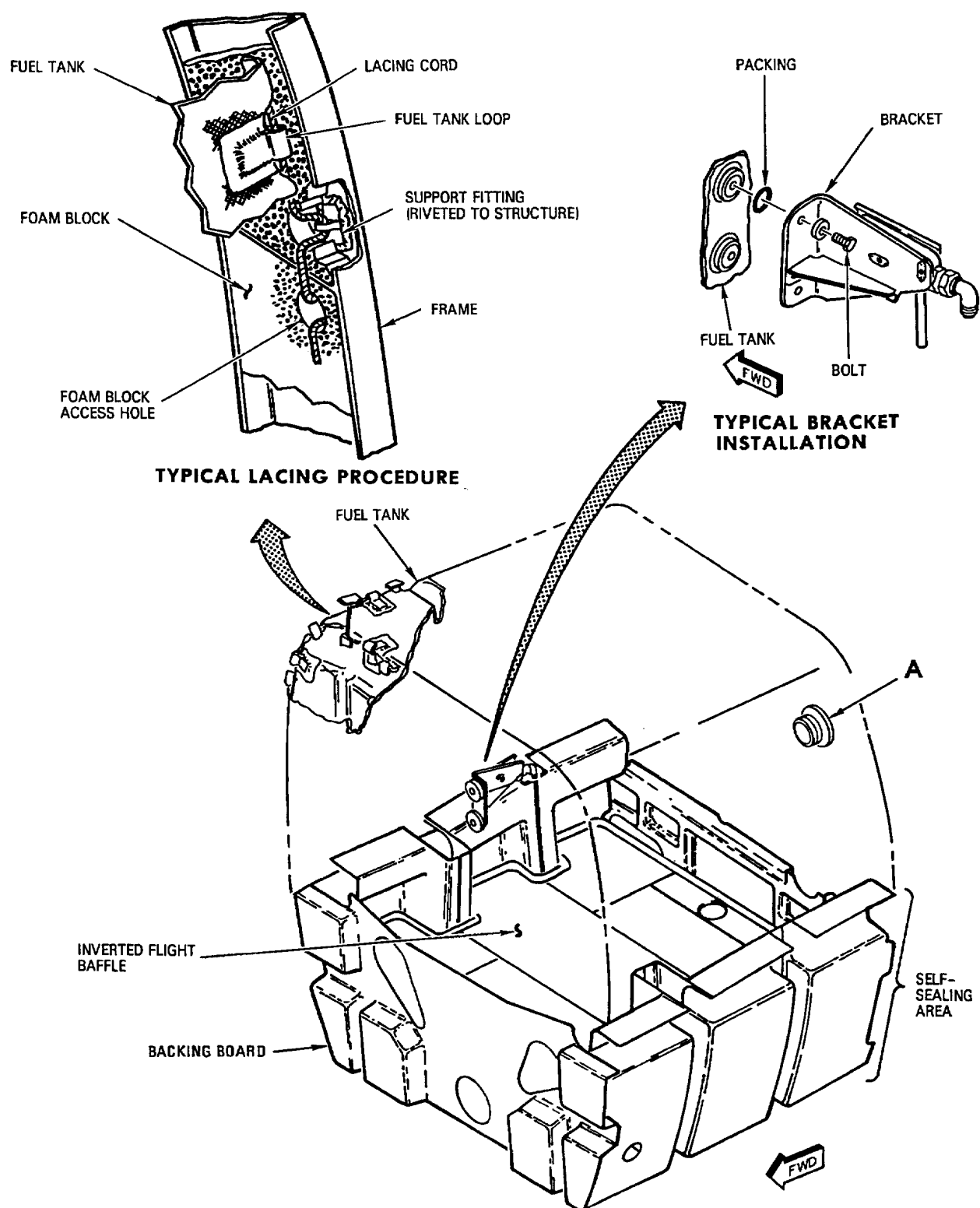
<b>Type/ Number</b>	<b>Date</b>	<b>Title and ECP No.</b>	<b>Date Incorp.</b>	<b>Remarks</b>
F/A-18 AFC 53	-	Elimination of Tanks 1 and 4 Sneak Circuit, Tank 4 Motive Flow Shutoff Valve, and Raised Inverted Baffle (ECP MDA-F/A-18-00055)	15 Jun 86	-
F/A-18 AFC 41	-	Installation of Equipment, Structure, Wiring and Attaching Hardware (ECP MDA-F/A-18-00054C1)	1 Nov 86	-



18AC-460-10-(1-1)22-SCAN

Figure 1. Fuel Storage System Component Locator (Sheet 1)

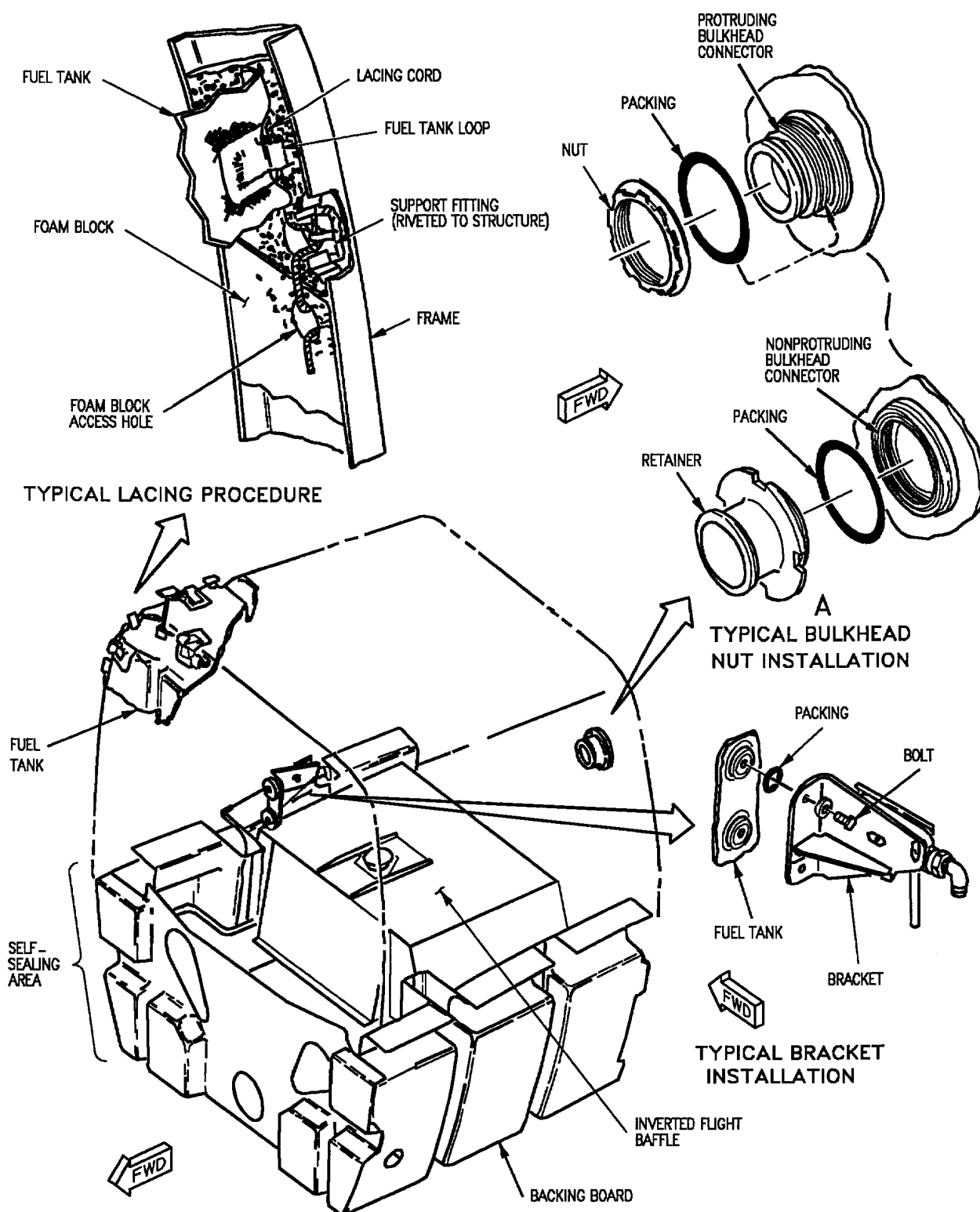




**NO. 2 FUEL TANK SHOWN (NO. 3 FUEL TANK SIMILAR)  
161353 THRU 161715 BEFORE F/A-18 AFC 53**

18AC-460-10-(1-2)22-SCAN

**Figure 1. Fuel Storage System Component Locator (Sheet 2)**



NO.2 FUEL TANK SHOWN (NO.3 FUEL TANK SIMILAR)  
161716 AND UP; ALSO 161353 THRU 161715 AFTER F/A-18 AFC 53

18AC-460-10-(1-3)22-SCAN

Figure 1. Fuel Storage System Component Locator (Sheet 3)

Nomenclature	Index No.	Ref Des
AIRCRAFT FUEL TANK FPU-6/A (ELLIPTICAL EXTERNAL FUEL TANK)	10	5CAY621
AIRCRAFT FUEL TANK FPU-8/A (CYLINDRICAL EXTERNAL FUEL TANK)	10	5CAY669
LEFT WING TANK	9	-
NO. 1 FUEL TANK (F/A-18A)	2	5CAP508
NO. 1 FUEL TANK (F/A-18B)	1	5CAC611
NO. 2 FUEL TANK	3	5CAP509
NO. 3 FUEL TANK	4	5CAP510
NO. 4 FUEL TANK	7	5CAP520
RIGHT WING FUEL TANK	5	-
VENT TANK	8	5CAS592
VERTICAL STABILIZER VENT TANK	6	-

Figure 1. Fuel Storage System Component Locator (Sheet 4)

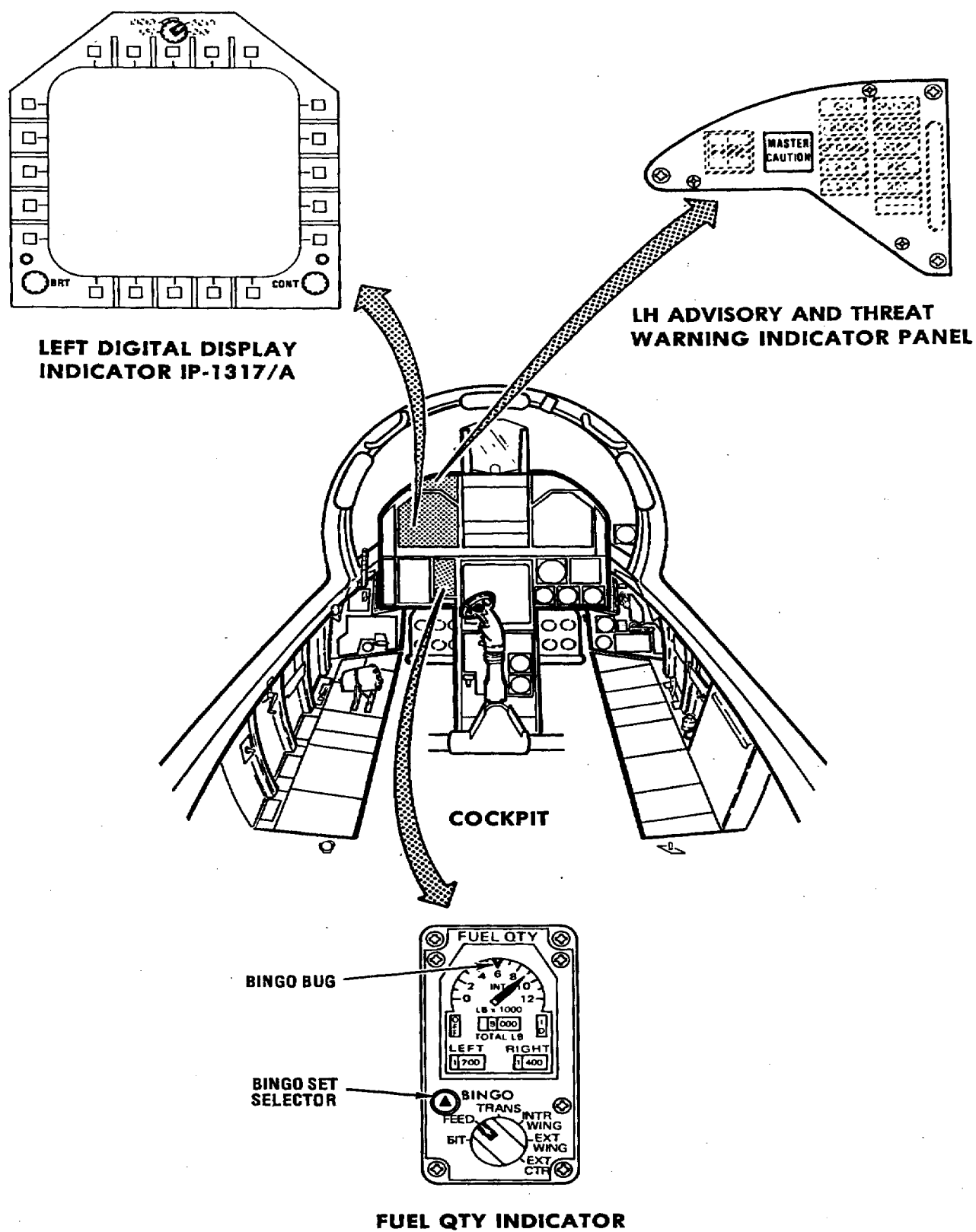
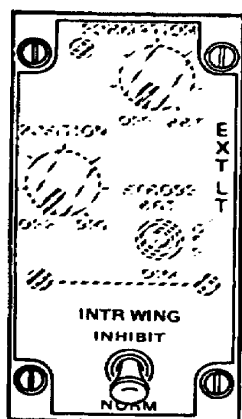
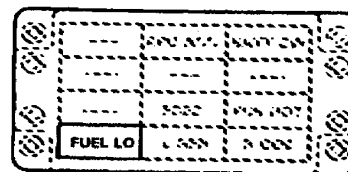


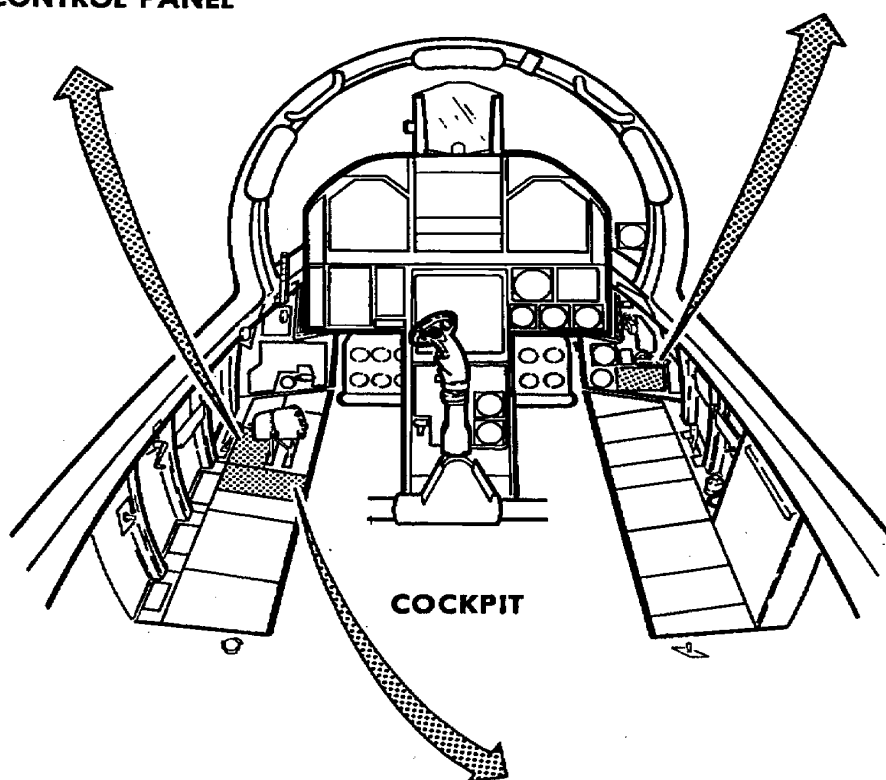
Figure 2. Fuel Storage System Component Locator (Sheet 1)



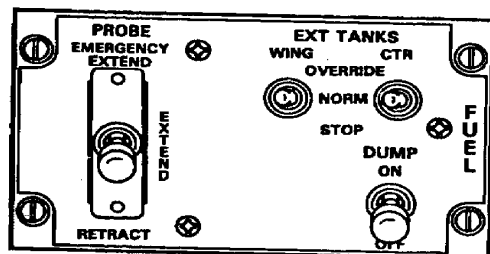
EXT LT CONTROL PANEL



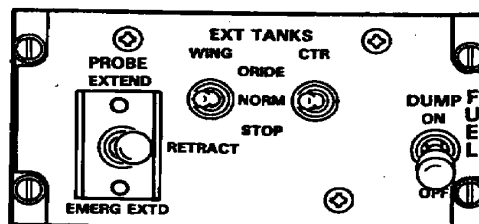
CAUTION LIGHT INDICATOR PANEL



COCKPIT



161353 THRU 161528 BEFORE  
F/A-18 AFC 41



161702 AND UP; ALSO 161353 THRU  
161528 AFTER F/A-18 AFC 41

FUEL SYSTEM CONTROL PANEL

Figure 2. Fuel Storage System Component Locator (Sheet 2)

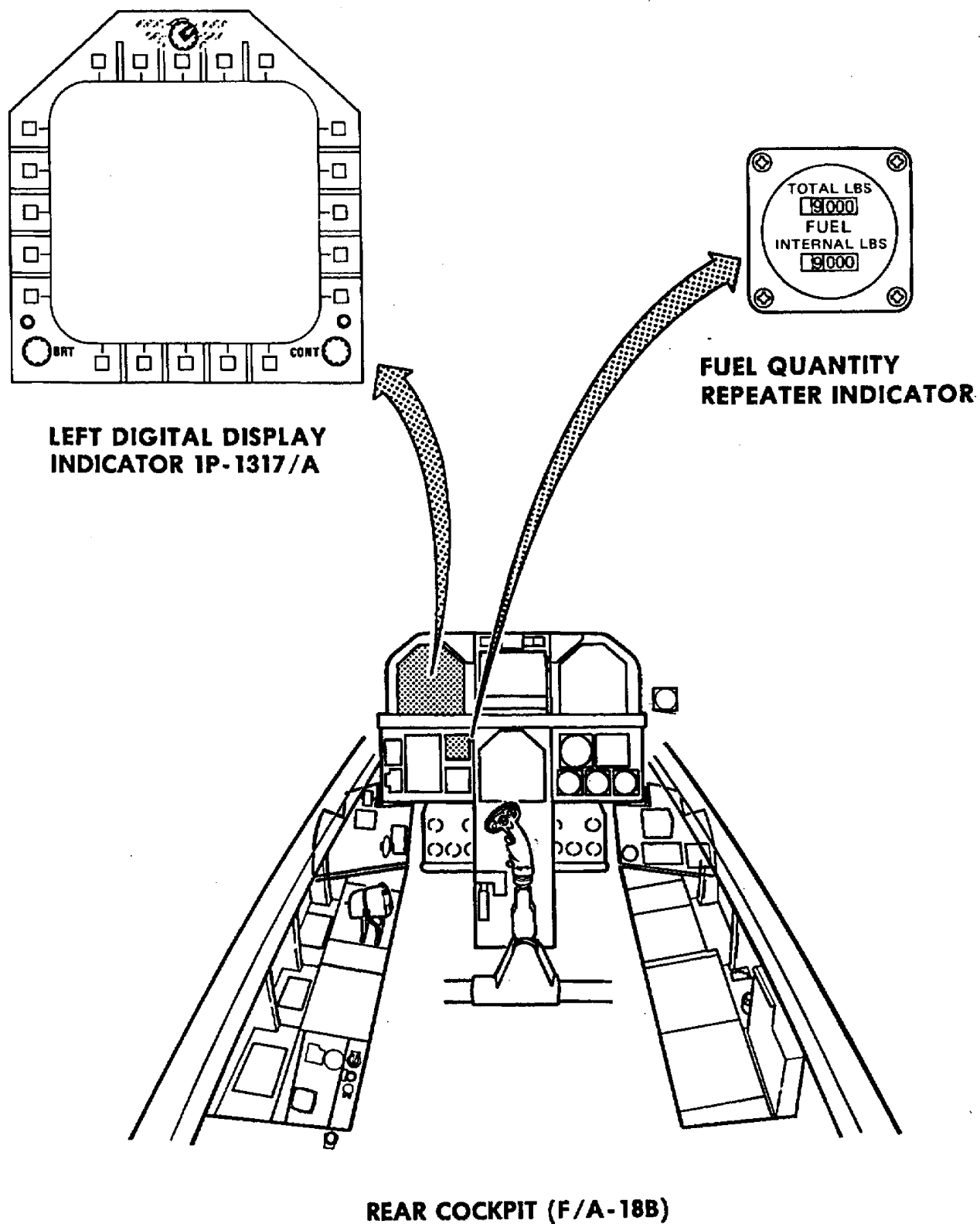


Figure 2. Fuel Storage System Component Locator (Sheet 3)

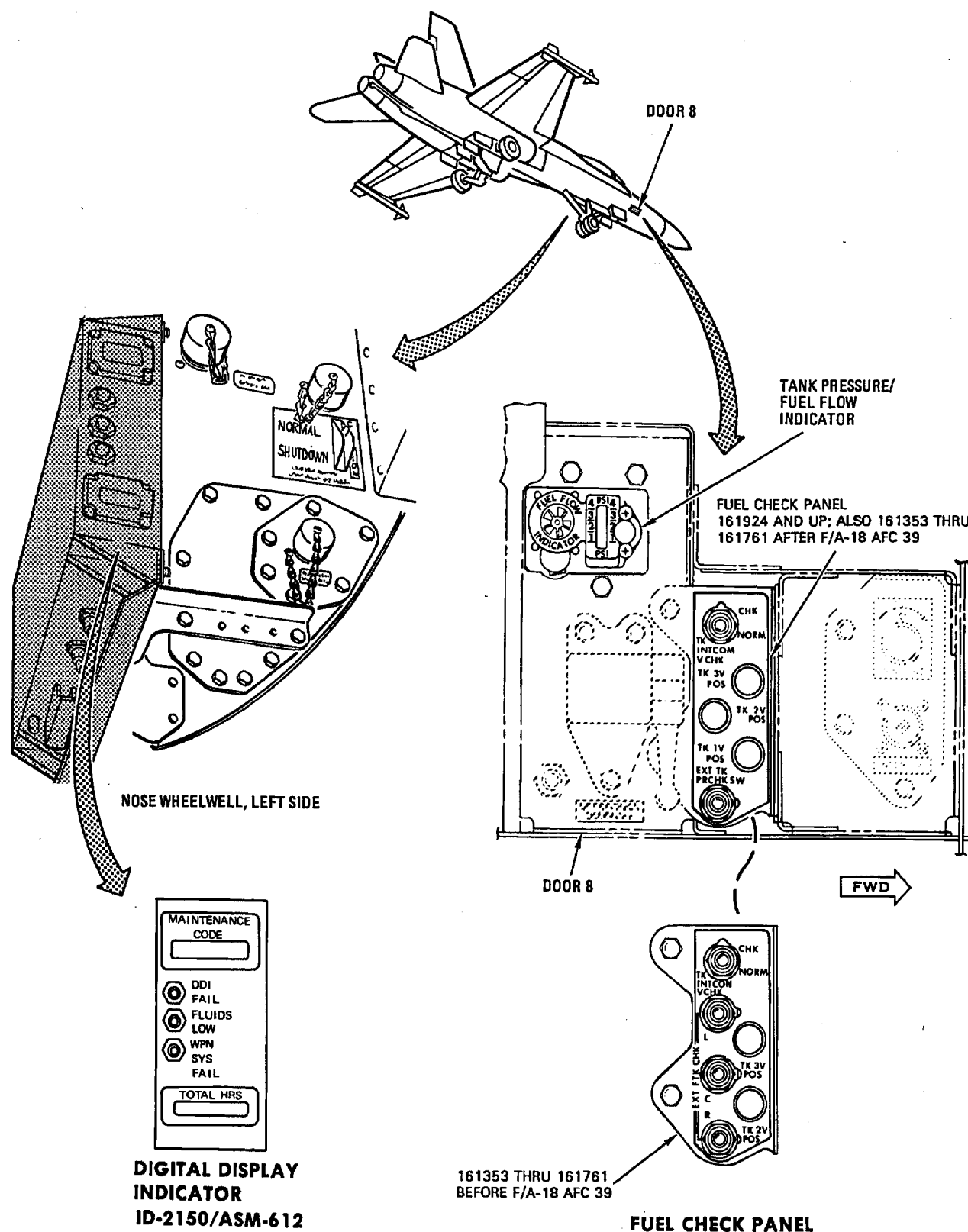


Figure 2. Fuel Storage System Component Locator (Sheet 4)





## ORGANIZATIONAL MAINTENANCE

## PRINCIPLES OF OPERATION

## SIMPLIFIED SCHEMATIC

## FUEL SYSTEM

## Reference Material

None

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## Record of Applicable Technical Directives

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 IAFC-056	27 Mar 85	Fuel System Components Replacement and System Inspections (ECP MDA-F/A-18-00158R1 and -00160)	1 Jul 85	-
F/A-18 AFC 53	-	Elimination of Tanks 1 and 4 Sneak Circuit, Tank 4 Motive Flow Shutoff Valve, and Raised Inverted Baffle (ECP MDA-F/A-18-00055)	15 Jun 86	-
F/A-18 AFC 18	-	Incorporation of Fuel Turbine Boost Pump/ Sealing of Raised Baffle in Tanks 2 and 3 (ECP MDA-F/A-18-00077)	15 Jun 86	-
F/A-18 AFC 21	-	Addition of Fuel/Air Heat Exchanger (ECP MDA-F/A-18-00033)	15 Jun 86	-
F/A-18 AFC 39	-	No. 1 Fuel Tank Interconnect Valve Replacement and Fuel Sequencing Modification (ECP MDA-F/A-18-00072C1)	1 Nov 86	-
F/A-18 AFC 70	-	Installation of Motive Boost Pump Pressure Switch (ECP-MDA-F/A-18-00158R2)	15 Jun 86	-

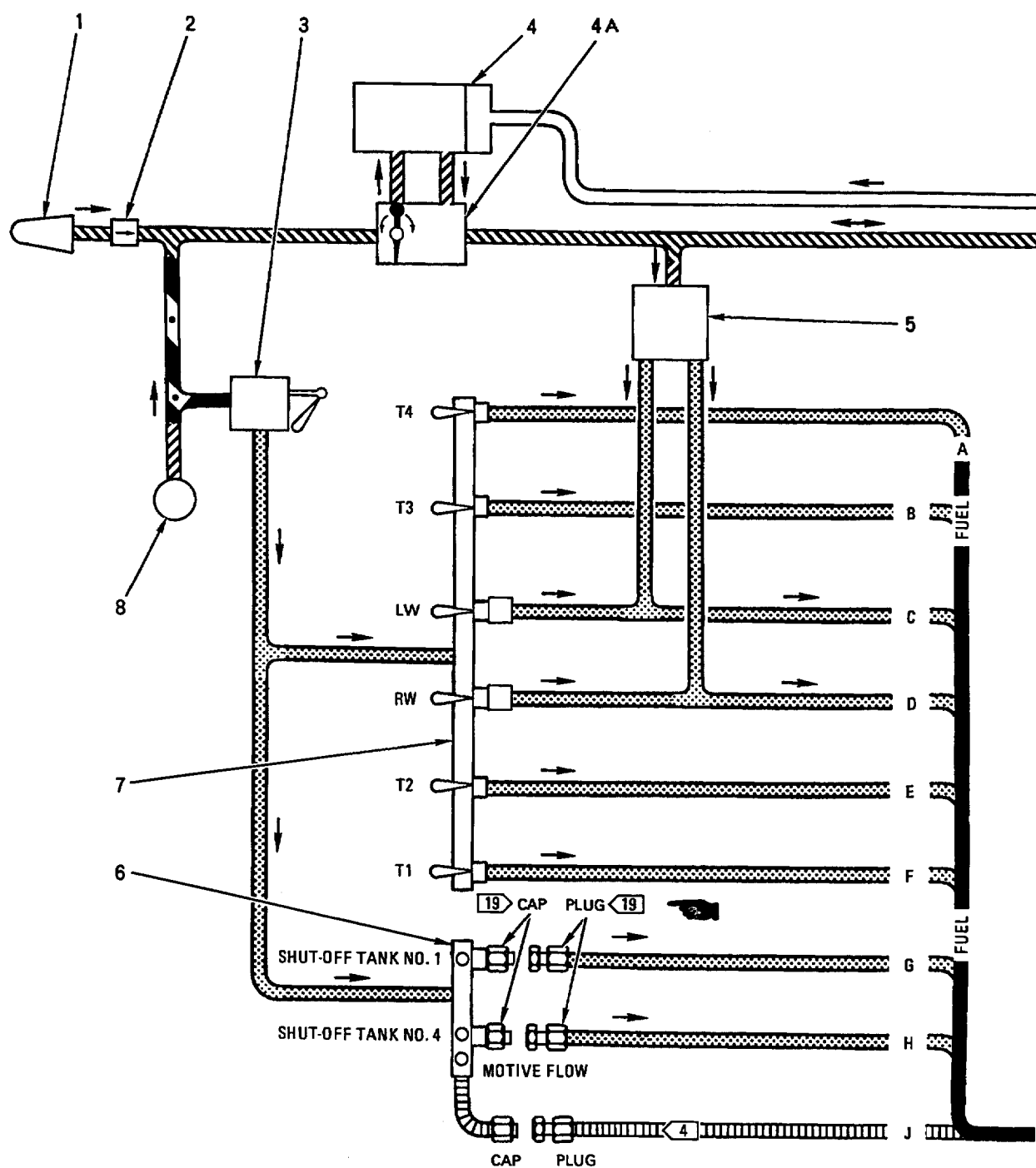
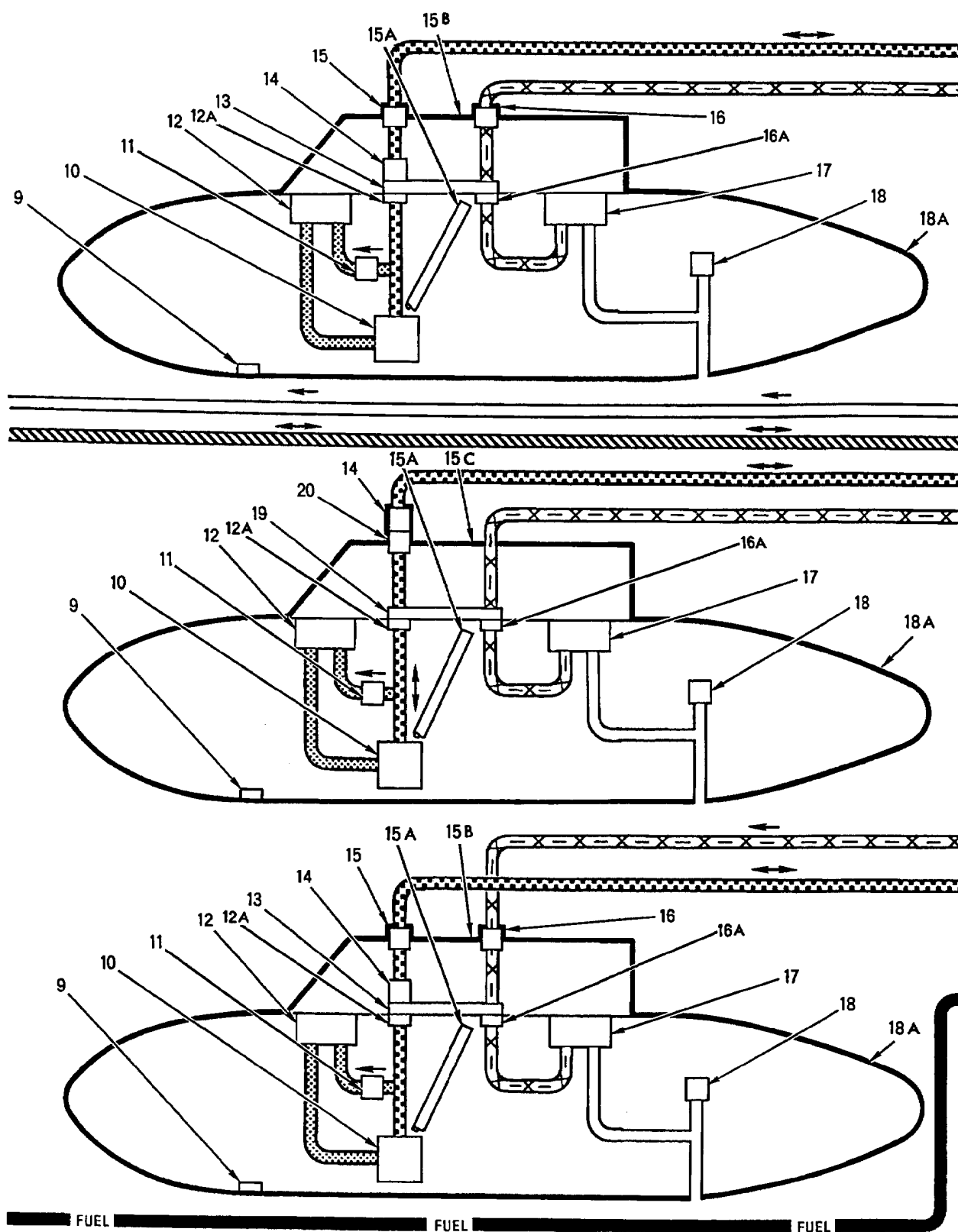


Figure 1. Fuel System Simplified Schematic (Sheet 1)



18AC-460-10-(27-2)G

Figure 1. Fuel System Simplified Schematic (Sheet 2)

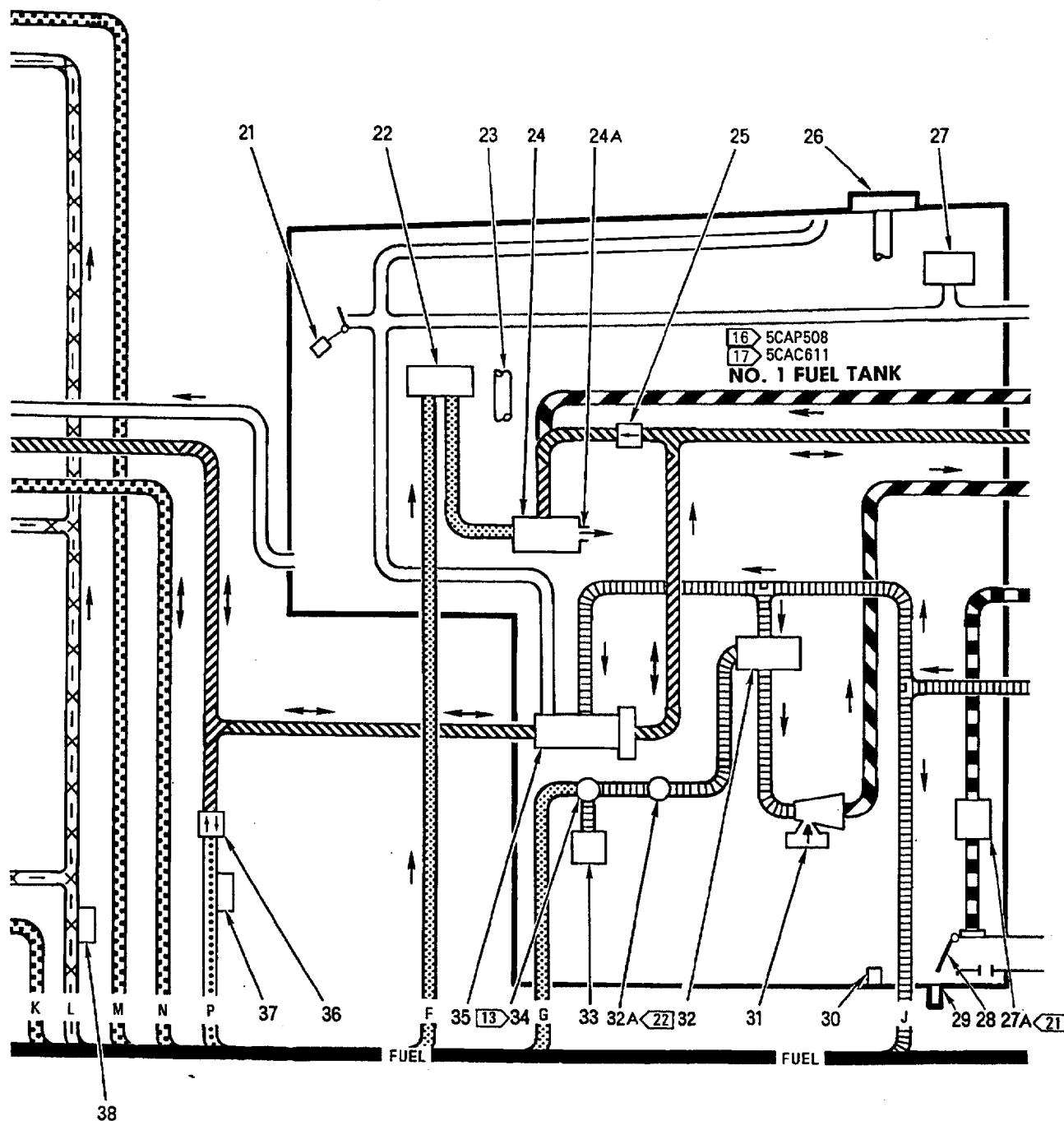


Figure 1. Fuel System Simplified Schematic (Sheet 3)

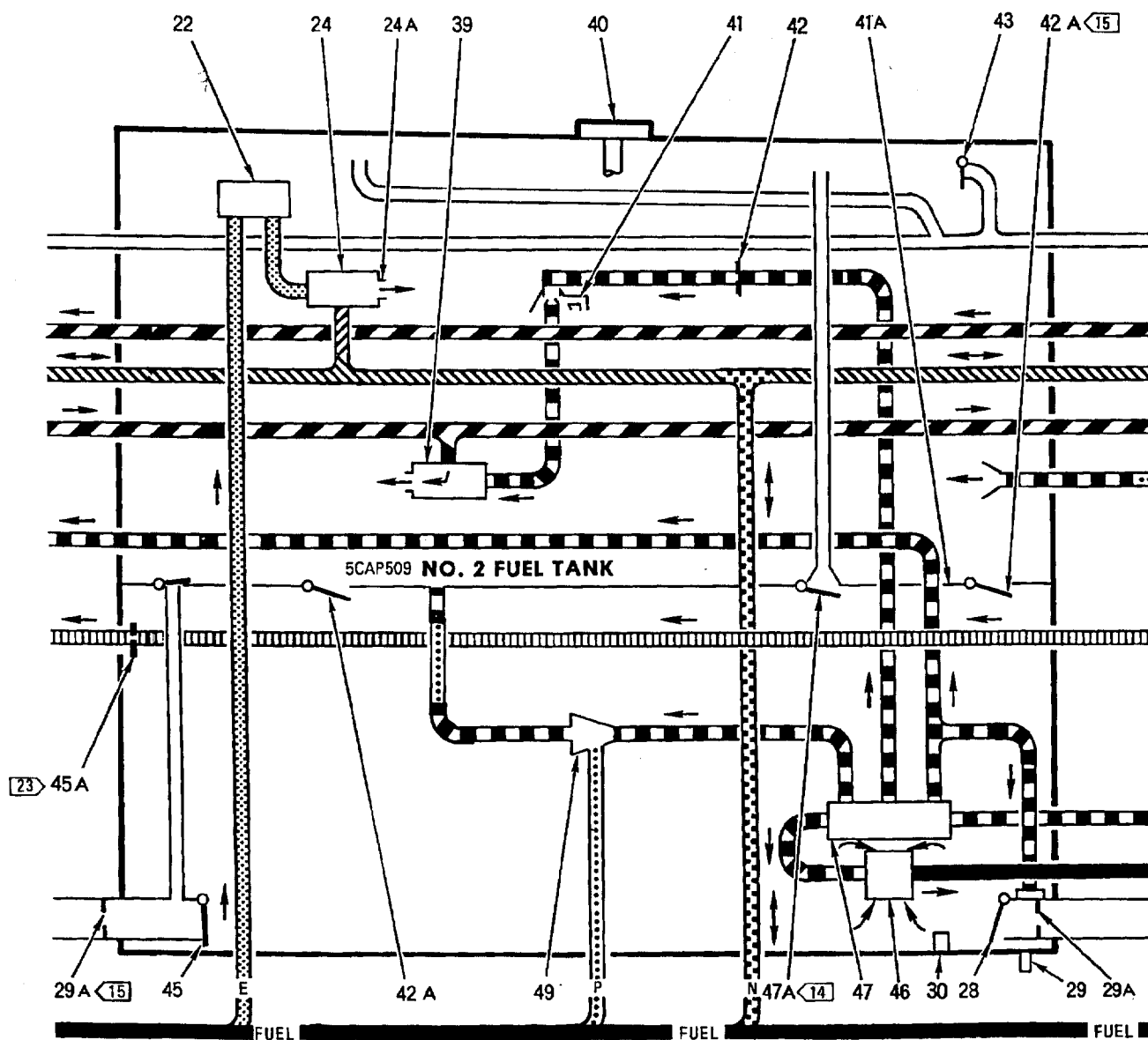


Figure 1. Fuel System Simplified Schematic (Sheet 4)

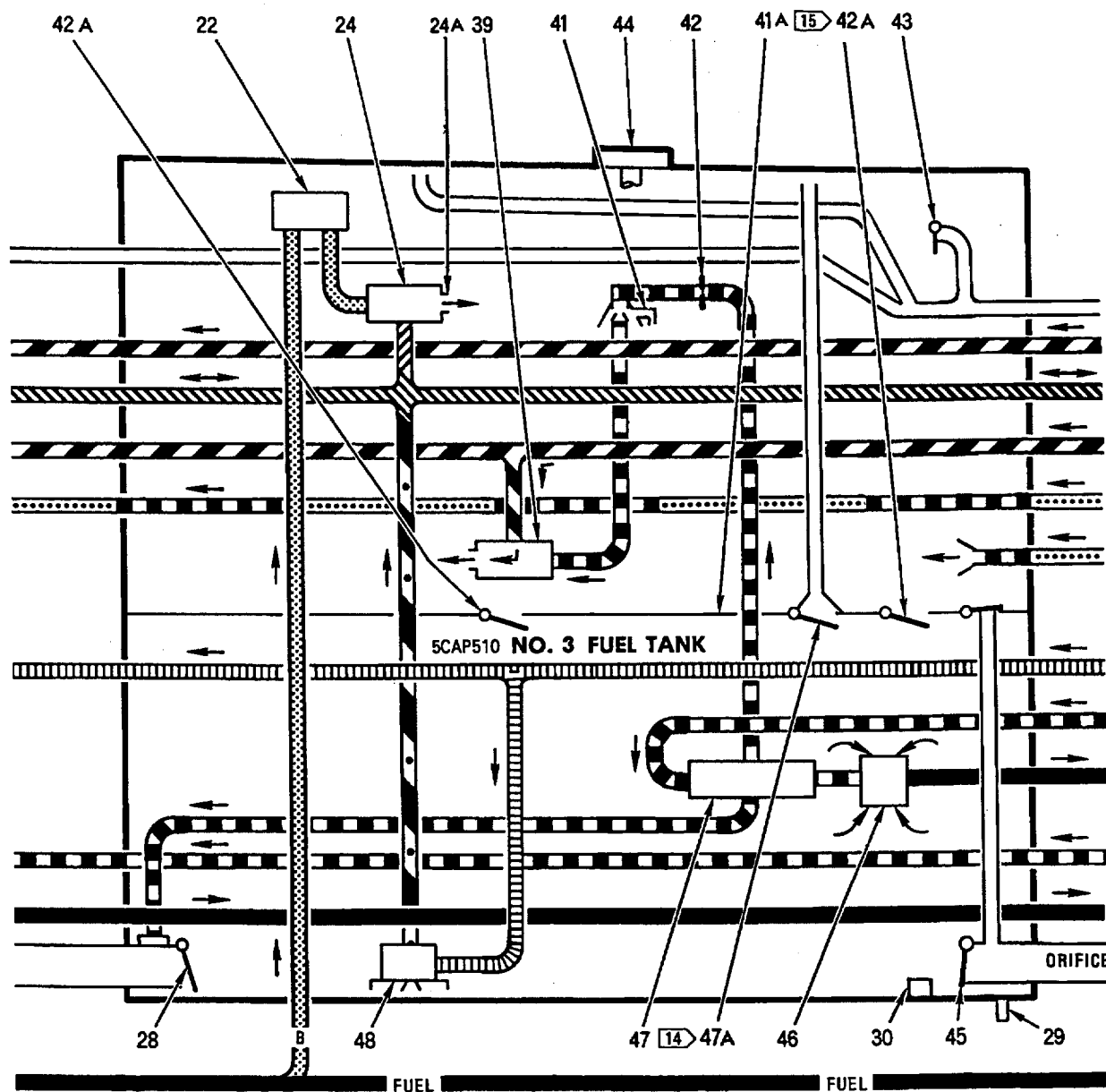
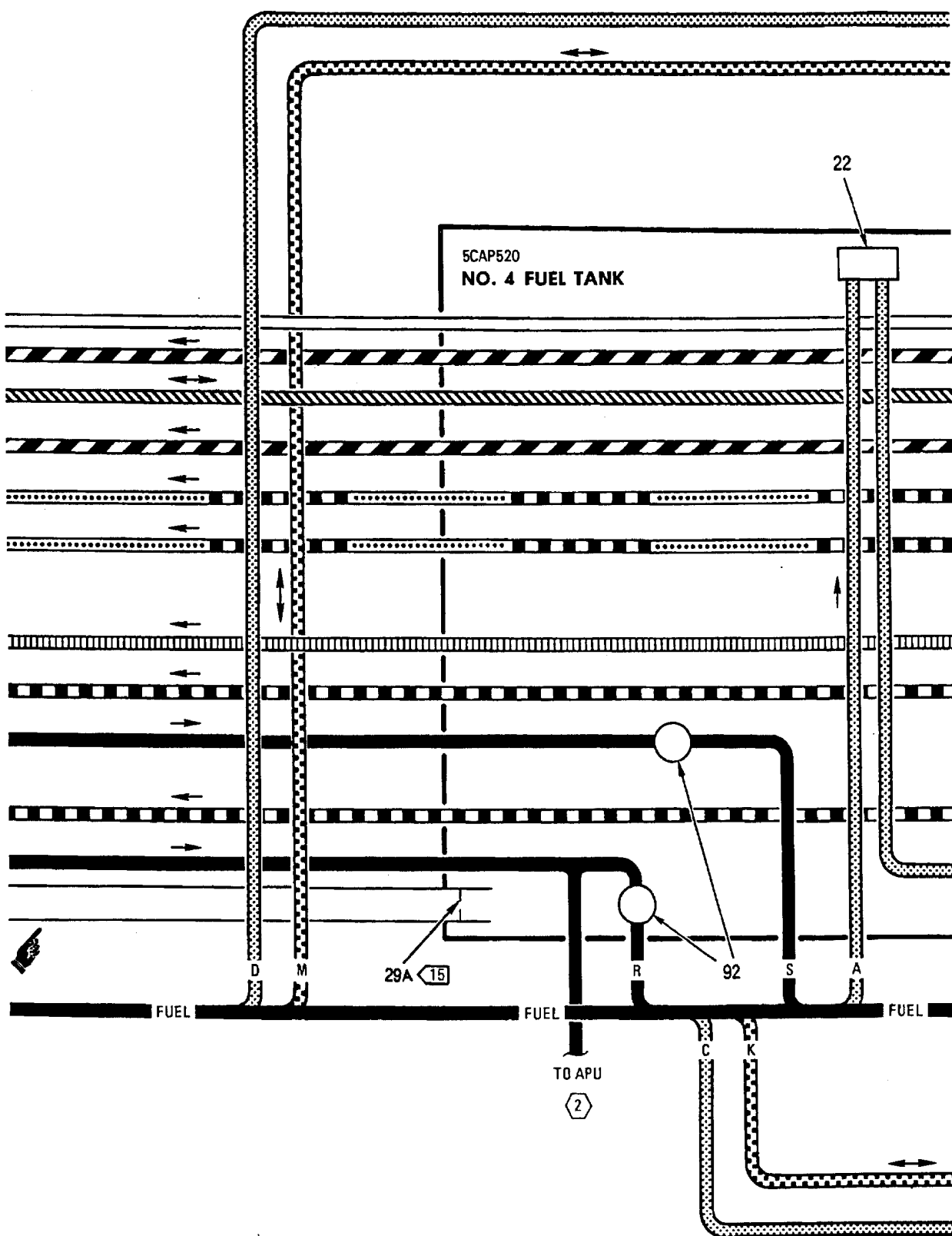
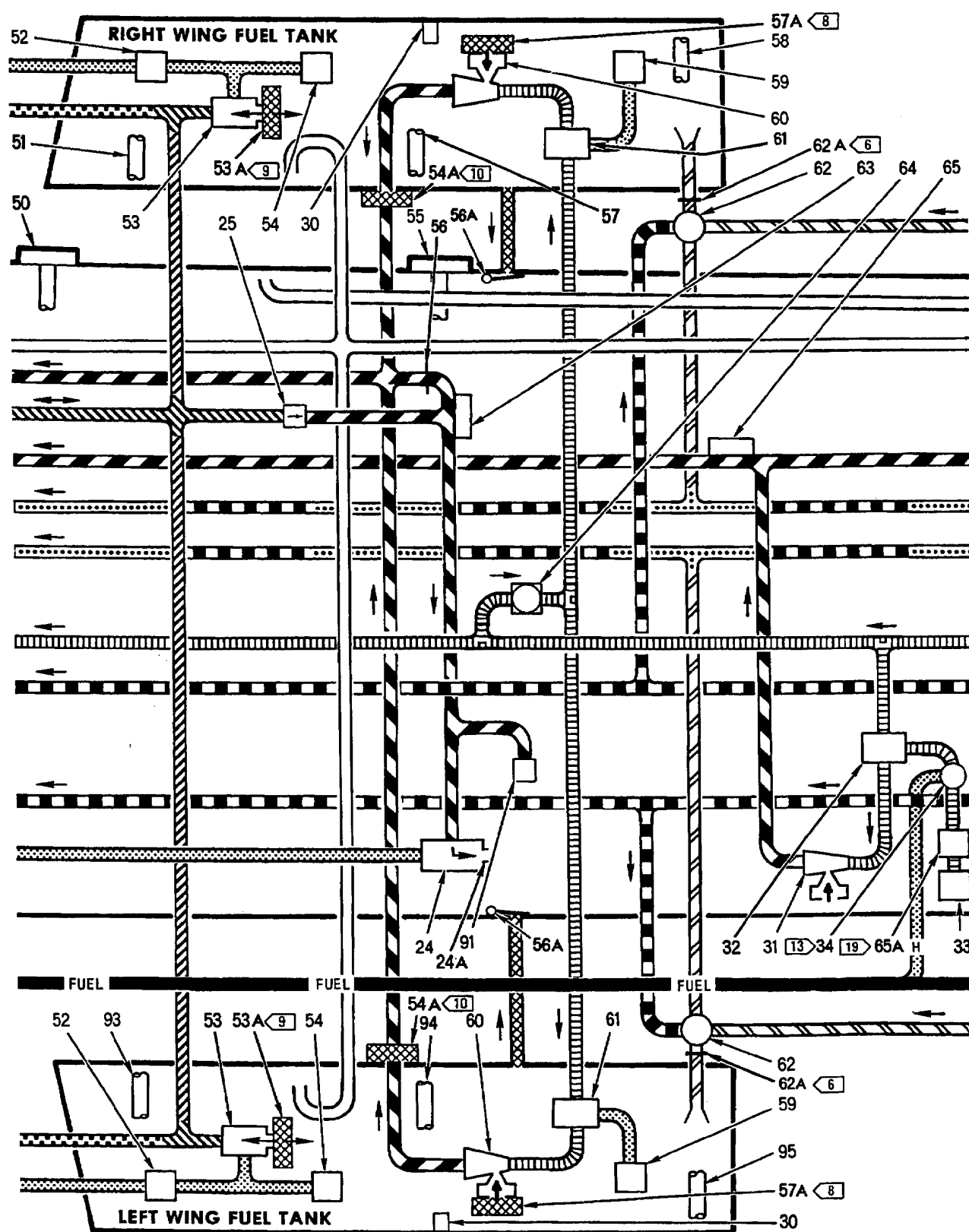


Figure 1. Fuel System Simplified Schematic (Sheet 5)



18AC-460-10-(27-6)22

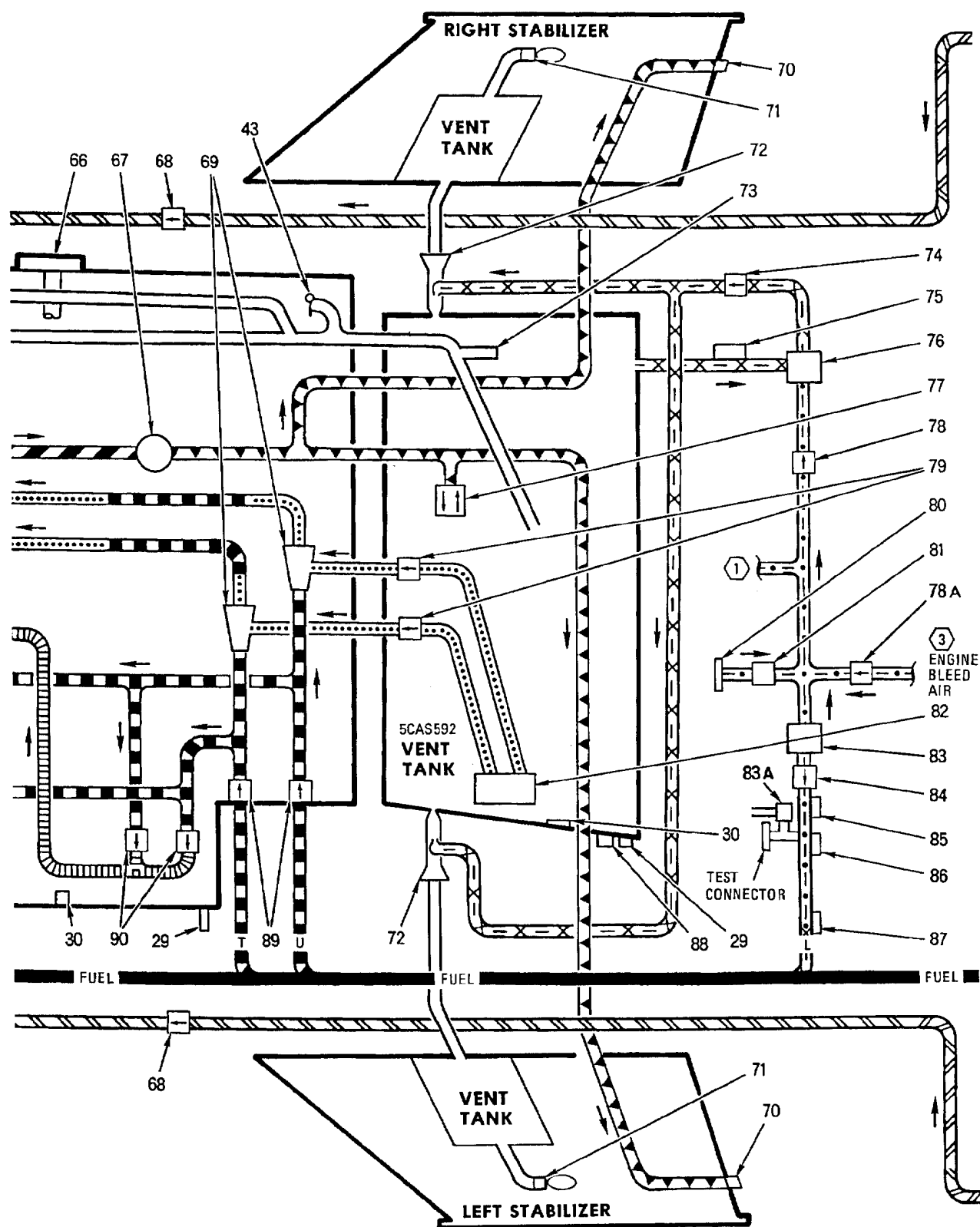
Figure 1. Fuel System Simplified Schematic (Sheet 6)



18AC-460-10-(27-7)K

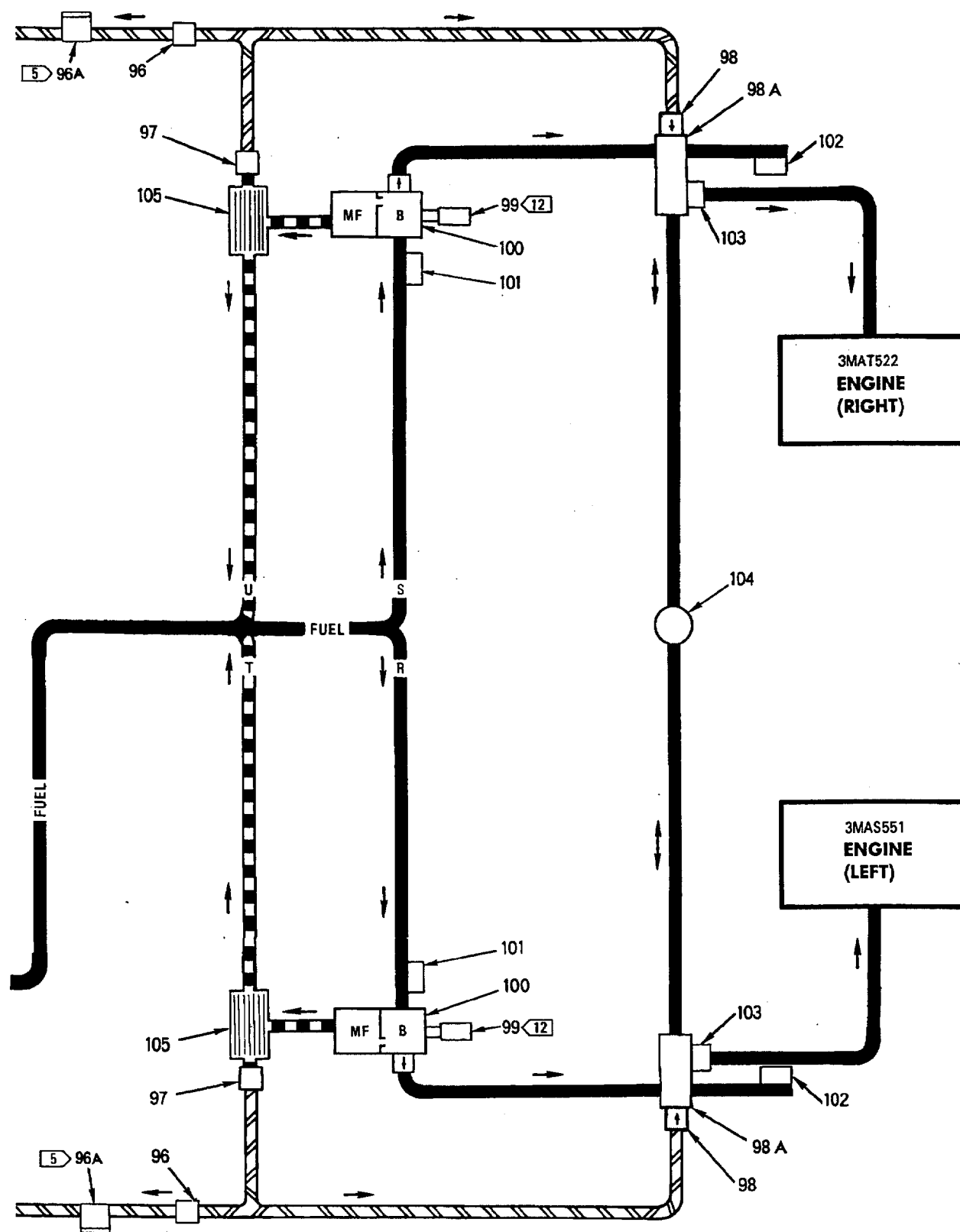
Figure 1. Fuel System Simplified Schematic (Sheet 7)





18AC-460-10-(27-8)20

Figure 1. Fuel System Simplified Schematic (Sheet 8)



18AC-460-10-(27-9)L

Figure 1. Fuel System Simplified Schematic (Sheet 9)

INDEX NO.	COMMON NAME	REF DES	LOCATION
1	INFLIGHT REFUELING PROBE NOZZLE	5VAB526	IFR PROBE WELL
2	INFLIGHT REFUELING CHECK VALVE	5VAB613	INTERNAL DOOR NBB
3	MASTER PRECHECK VALVE	5VAD624	DOOR 8
4	TANK PRESSURE /FUEL FLOW INDICATOR	5DSD625	DOOR 8
4A	FUEL FLOW SENSOR	5VAD645	INTERNAL DOOR NWC
5	WING REFUEL LOCKOUT VALVE	5L-F116	DOOR 108
6	FUEL LEVEL CONTROL SELECTOR VALVE	5VAG579	NLG WHEELWELL
7	INDIVIDUAL TANK PRECHECK VALVE	5VAF627	DOOR 141 L/R
8	GROUND REFUEL/DEFUEL RECEPTACLE	5VAD626	DOOR 8
9	DRAIN VALVE	5VAY628	EXT TANK
10	REFUEL/TRANSFER SHUTOFF VALVE	5L-Y061	
11	MANUAL PRECHECK VALVE	5VAY631	EXT TANK
12	FUEL LEVEL CONTROL PILOT VALVE	5L-Y060	EXT TANK
12A	FUEL TANK TO PYLON FUEL PROBE	5VAY637	EXT TANK
13	FUEL/AIR COUPLING VALVE	5VAW623	LEFT WING PYLON
14	FLAME ARRESTOR	5VAR525	RIGHT WING PYLON
		5VAW673	DOOR 27
15	WING FUEL COUPLING VALVE	5VAU575	LEFT WING PYLON
		5VAV576	RIGHT WING PYLON
15A	EXTERNAL FUEL TANK FUEL QUANTITY TRANSMITTER	5A-Y062	EXT TANK
15B	AIRCRAFT WING PYLON SUU-63/A	61A-W507	WING
15C	AIRCRAFT FUSELAGE CENTERLINE PYLON SUU-62/A	61A-Z506	AIRCRAFT CENTERLINE
16	WING AIR COUPLING VALVE	5VAU577	LEFT WING
		5VAV578	RIGHT WING
16A	FUEL TANK TO AIR PROBE	5VAY642	EXT TANK
17	PRESSURIZATION AND VENT VALVE	5VAY630	EXT TANK
18	EXTERNAL FUEL TANK PRESSURE RELIEF VALVE	5VAY641	EXT TANK
18A	AIRCRAFT FUEL TANK		
	FPU-6/A (ELLIPTICAL)	5CAY621	PYLON
	FPU-8/A (CYLINDRICAL)	5CAY669	PYLON
19	FUEL/AIR COUPLING VALVES	5VAZ629	CENTERLINE PYLON
20	FUSELAGE TO PYLON FUEL/AIR COUPLING VALVE	5VAR522	DOOR 27
21	CLIMB VENT CHECK VALVE	5VAP531	TANK 1
22	HIGH LEVEL PILOT VALVE	5VAP539	TANK 1
		5VAP594	TANK 2
		5VAP583	TANK 3
		5VAP556	TANK 4
23	FUEL QUANTITY TRANSMITTER (TANK 1-FORWARD)	16 5A-F028	DOOR 18 (F/A-18A)
		17 5A-E028	REAR COCKPIT (F/A-18B)
24	FUEL LEVEL CONTROL SHUTOFF VALVE	5VAP541	TANK 1
		5VAP596	TANK 2
		5VAP610	TANK 3
		5VAP569	TANK 4
24A	FLUID FLOW PRESSURE FUELING LINE RESTRICTOR	5RAP661	TANK 1
		5RAP662	TANK 2
		5RAP663	TANK 3
25	REFUEL/TRANSFER CHECK VALVE	5VAP532	TANK 1
		5VAP557	TANK 4
26	FUEL QUANTITY TRANSMITTER (TANK 1-AFT)	5A-F029	DOOR 18 (F/A-18A) OR REAR COCKPIT (F/A-18B)
27	DIVE VENT CHECK VALVE	5VAP530	TANK 1
27A	FUEL LOW LEVEL SHUTOFF VALVE	5L-E171	TANK 1
28	PRESSURE OPERATED INTERCONNECT VALVE	20 5VAP538	TANK 1
		21 5S-E172	TANK 1
		5S-R132	TANK 2
		5S-R131	TANK 3
29	CAVITY DRAIN		TANK 1
			TANK 2
			TANK 3
			TANK 4
29A	FUEL TANK PRESSURE OPERATED INTERCONNECT VALVE RESTRICTOR	15 5RAP664	TANK 2 (FORWARD)
		5RAP665	TANK 2 (AFT)
		15 5RAP666	TANK 4

Figure 1. Fuel System Simplified Schematic (Sheet 10)

INDEX NO.	COMMON NAME	REF DES	LOCATION
30	TANK DRAIN VALVE	5VAP614 5VAP615 5VAP616 5VAP586 5VAS619 5VAU617 5VAV618	TANK 1 TANK 2 TANK 3 TANK 4 VENT TANK LEFT WING RIGHT WING
31	TRANSFER JET EJECTOR	5BAP536 5BAP567	TANK 1 TANK 4
32	TRANSFER SHUTOFF VALVE	5VAP534 5VAP565	TANK 1 TANK 4
22 32A	TRANSFER CONTROL VALVE	5L-F160	TANK 1
33	PILOT VALVE	5VAP537 5VAP519	TANK 1 TANK 4
13 34	TRANSFER PRECHECK VALVE	5VAP606 5VAP589	TANK 1 TANK 4
35	REFUEL/DEFUEL SHUTOFF VALVE	5VAP533	TANK 1
36	SCAVENGE CONTROL VALVE	5VAD622	DOOR 33
37	REFUEL SCAVENGE LINE PRESSURE TRANSDUCER	5MTF140	DOOR 35R
38	EXTERNAL TANKS AIR PRESSURE TRANSDUCER	5MTR130	DOOR 42
39	TRANSFER SHUTOFF VALVE	5VAP597 5VAP605	TANK 2 TANK 3
40	FUEL QUANTITY TRANSMITTER (TANK 2)	5A-R030	DOOR 26
41	FUEL LEVEL SENSOR	5VAP595 5VAP590	TANK 2 TANK 3
41A	INVERTED FLIGHT BAFFLE	5CAP516 5CAP517	TANK 2 TANK 3
42	JET LEVEL SENSOR TUBE RESTRICTOR	5RAP667 5RAP668	TANK 2 TANK 3
15 42A	INVERTED FLIGHT VENT CHECK VALVE	5VAR677 5VAR678	TANK 2 TANK 3
15 43	DIVE VENT CHECK VALVE	5VAP593 5VAP582 5VAP555	TANK 2 TANK 3 TANK 4
44	FUEL QUANTITY TRANSMITTER (TANK 3)	5A-R031	DOOR 31
45	GRAVITY FEED CHECK VALVE	5VAP600 5VAP608	TANK 2 TANK 3
23 45A	FUEL TRANSFER RESTRICTOR	5RAP659	TANK 2
7 46	ENGINE FUEL BOOST JET EJECTOR	5BAP599	TANK 2
18	ENGINE FUEL TURBINE BOOST PUMP	5VAP679	TANK 2
7	ENGINE FEED JET EJECTOR	5BAP591	TANK 3
18	ENGINE FUEL TURBINE BOOST PUMP	5BAR680	TANK 3
47	WASH FILTER	5FAP632 5FAP633	TANK 2 TANK 3
14 47A	FUEL TANK INVERTED FLIGHT VENT CHECK VALVE	5VAR677 5VAR678	TANK 2 TANK 3
48	DEFUEL VALVE	5VAP521	TANK 3
49	REFUELING MANIFOLD SCAVENGE JET EJECTOR	5BAP598	TANK 2
50	FUEL QUANTITY TRANSMITTER (TANK 4)	5A-R032	DOOR 40
51	INBOARD WING FUEL QUANTITY TRANSMITTER	5A-V043	DOOR 34R
52	HIGH LEVEL REFUEL/DEFUEL PILOT VALVE	5VAV574 5VAU573 5VAV554	DOOR 34R DOOR 34L DOOR 76R
53	WING REFUEL/DEFUEL SHUTOFF VALVE	5VAU553 5FAU683 5FAV684	DOOR 76L DOOR 76L DOOR 76R
9 53A	STRAINER	5VAV552 5VAU551	DOOR 77R DOOR 77L
54	WING LOW LEVEL REFUEL/DEFUEL PILOT VALVE	5FAU681 5FAV682	DOOR 41L DOOR 41R
10 54A	FUEL TRANSFER TUBE AND STRAINER	5A-R033 5RAP660	DOOR 43 TANK 4
55	FUEL QUANTITY TRANSMITTER (TANK 4)		
56	FUEL TRANSFER RESTRICTOR		
56A	WING FUEL GRAVITY CHECK VALVES		
	RIGHT	5VAR588	TANK 4
	LEFT	5VAP587	TANK 4

Figure 1. Fuel System Simplified Schematic (Sheet 11)






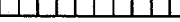











INDEX NO.	COMMON NAME	REF DES	LOCATION
57	CENTER WING FUEL QUANTITY TRANSMITTER	5A-V042	DOOR 76R
8 57A	STRAINER	5FAU685	DOOR 77L
		5FAV686	DOOR 77R
58	OUTBD WING FUEL QUANTITY TRANSMITTER	5A-V041	DOOR 77R
59	WING MOTIVE FLOW PILOT FLOAT VALVE	5VAV529	DOOR 106R
		5VAU528	DOOR 106L
60	WING TRANSFER JET EJECTOR	5BAV549	DOOR 77R
		5BAU548	DOOR 77L
61	MOTIVE FLOW SHUTOFF VALVE	5VAV544	DOOR 77R
		5VAU543	DOOR 77L
62	FUEL DIVERTER VALVE	5L-R118	TANK 4
		5L-P119	TANK 4
6 62A	HOT FUEL RECIRCULATION WING RESTRICTOR	5RAP657	DOOR 41L
		5RAR658	DOOR 41R
63	WING TRANSFER PRESSURE TRANSDUCER	5MTR125	DOOR 41L
64	WING DAMAGE SHUTOFF VALVE	5L-R110	TANK 4
65	FUSELAGE TRANSFER PRESSURE TRANSDUCER	5MTP126	DOOR 41R
19 65A	TANK 4 TRANSFER CONTROL VALVE	5L-R167	TANK 4
66	FUEL QUANTITY TRANSMITTER (TANK 4)	5A-R034	DOOR 43
67	FUEL DUMP VALVE	5B-P069	TANK 4
68	HOT FUEL RECIRCULATION CHECK VALVE	5VAP585	DOOR 53L
		5VAR584	DOOR 53R
69	VENT SCAVENGE JET EJECTOR	5BAP559	TANK 4
		5BAR560	TANK 4
70	DUMPLINE FLAME ARRESTOR		
	LEFT	5MPS502	LEFT STABILIZER
	RIGHT	5MPT503	RIGHT STABILIZER
71	VENT LINE FLAME ARRESTOR		
	LEFT	5MPS504	LEFT STABILIZER
	RIGHT	5MPT505	RIGHT STABILIZER
72	PRESSURIZATION SYSTEM AIR PUMP		
	LEFT	5BAS511	COVER 63L
	RIGHT	5BAT512	COVER 63R
73	SIPHON BREAKER CHECK VALVE	5VAS545	VENT TANK
74	INTERNAL AIR PRESSURIZATION CHECK VALVE	5VAT513	DOOR 63R
75	AIR PRESSURE SWITCH	5S-T106	DOOR 63R
76	INTERNAL FUEL TANKS AIR PRESSURE REGULATOR	5L-T104	DOOR 63R
77	DUMPLINE AUTOMATIC DRAIN VALVE	5VAS518	VENT TANK
78	BLEED AIR CHECK VALVE	5VAT507	DOOR 63R
78A	BLEED AIR CHECK VALVE	5VAT506	DOOR 42
79	VENT TANK SCAVENGE FUEL CHECK VALVE		
	LEFT	5VAS602	VENT TANK
	RIGHT	5VAT612	VENT TANK
80	GROUND AIR PRESSURIZATION CONNECTOR	5PAP636	L MLG WHEELWELL
81	GROUND AIR PRESSURIZATION FILTER	5FAP638	L MLG WHEELWELL
82	SCAVENGE PUMP INLET SCREEN	5FAS604	VENT TANK
83	EXTERNAL FUEL TANK AIR PRESSURE REGULATOR	5L-P102	DOOR 42
83A	EXTERNAL FUEL PRESSURIZATION BLEED ORIFICE	5VAP654	L MLG WHEELWELL
84	EXTERNAL FUEL TANK PRESSURE REGULATOR CHECK VALVE	5VAR620	DOOR 42
85	EXTERNAL FUEL SYSTEM AIR PRESSURE SWITCH (5 PSI)	5S-P151	L MLG WHEELWELL
86	EXTERNAL FUEL SYSTEM AIR PRESSURE SWITCH (34 PSI)	5S-P152	L MLG WHEELWELL
87	EXTERNAL TANKS AIR PRESSURE TRANSDUCER	5MTR130	DOOR 42
88	VENT TANK PRESSURE TRANSDUCER	5MTT129	DOOR 66
89	ENGINE MOTIVE FLOW CHECK VALVE		
	LEFT	5VAP561	TANK 4
	RIGHT	5VAR562	TANK 4
90	ENGINE TRANSFER MOTIVE FLOW CHECK VALVE		
	LEFT	5VAP563	TANK 4
	RIGHT	5VAR564	TANK 4
91	AUTOMATIC DRAIN VALVE	5VAP568	TANK 4
92	ENGINE FUEL SHUTOFF VALVE		
	LEFT	5B-P072	L MLG WHEELWELL
	RIGHT	5B-R070	R MLG WHEELWELL
93	INBOARD WING FUEL QUANTITY TRANSMITTER	5A-U039	DOOR 34L

Figure 1. Fuel System Simplified Schematic (Sheet 12)

INDEX NO.	COMMON NAME	REF DES	LOCATION
94	CENTER WING FUEL QUANTITY TRANSMITTER	5A-U038	DOOR 76L
95	OUTBOARD WING FUEL QUANTITY TRANSMITTER	5A-U037	DOOR 77L
96	HYDRAULIC OIL/FUEL HEAT EXCHANGER		
	RIGHT	10HPR519	DOOR 53R
	LEFT	10HPP518	DOOR 53L
5 96A	FUEL/AIR HEAT EXCHANGER		
	RIGHT	5MPP670	R MISSILE FAIRING
	LEFT	5MPR671	L MISSILE FAIRING
97	AMAD FUEL/OIL HEAT EXCHANGER		
	RIGHT	3HPT532	DOOR 53R
	LEFT	3HPS531	DOOR 53L
98	FUEL/OIL HEAT EXCHANGER CHECK VALVE		
	RIGHT	5VAT524	DOOR 53R
	LEFT	5VAS523	DOOR 53L
98A	FUEL CROSSFEED MANIFOLD		DOOR 53L/R
12 99	FUEL BOOST PRESSURE SWITCH		
	RIGHT	5S-P113	DOOR 138L
	LEFT	5S-R114	DOOR 53R
100	MOTIVE FLOW/BOOST PUMP		
	RIGHT	5BAT514	DOOR 53R
	LEFT	5BAS515	DOOR 53L
101	BOOST INLET PRESSURE TRANSDUCER		
	RIGHT	5MTR128	R MLG WHEELWELL
	LEFT	5MTP127	L MLG WHEELWELL
102	FUEL FEEDLINE TEMPERATURE SENSOR		
	RIGHT	5TCR112	DOOR 53R
	LEFT	5TCP111	DOOR 53L
103	ENGINE FUEL COUPLING CHECK VALVE		
	RIGHT	5VAR640	DOOR 64R
	LEFT	5VAP639	DOOR 64L
104	FUEL CROSSFEED SHUTOFF VALVE	5B-P071	DOOR 52
105	HEAT EXCHANGERS WASH FILTER		
	RIGHT	5FAR648	DOOR 53R
	LEFT	5FAP647	DOOR 53L

Figure 1. Fuel System Simplified Schematic (Sheet 13)

## LEGEND

 FUEL 	HIGHWAY FOR MULTIPLE FUEL PATTERNS
	PRECHECK
	REFUEL
	VENT
	TRANSFER MOTIVE FLOW
	REFUEL TRANSFER
	PRECONDITIONED BLEED AIR
	ENGINE FUEL FEED
	DEFUEL
	TRANSFER
	HOT FUEL RECIRCULATION
	FUEL DUMP
	GRAVITY FEED
	MOTIVE FLOW
	SCAVENGE
	REGULATED AIR

- ① AMAD SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-240-100, WP006 00.
- ② APU SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-240-100, WP005 00.
- ③ AIR CYCLE AIR CONDITIONING SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-410-100, WP007 00.
- ④ MOTIVE FLOW LINE NORMALLY PLUGGED. MOTIVE FLOW LINE CONNECTED DURING INTERNAL FUEL TRANSFER AND ENGINE FUEL SUPPLY SYSTEM TEST.
- ⑤ 161520 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 21.
- ⑥ 161353 THRU 161519 BEFORE F/A-18 AFC 18.
- ⑦ 161353 THRU 161761 BEFORE F/A-18 AFC 18.
- ⑧ 161924 AND UP.
- ⑨ 161735 AND UP.
- ⑩ 161735 THRU 161924.
- ⑪ 161925 AND UP.
- ⑫ 163119 AND UP; ALSO 161353 THRU 163118 AFTER F/A-18 AFC 70 OR 161353 THRU 161924 BEFORE F/A-18 IAFC-056. FUEL BOOST PRESSURE SWITCH IS REMOVED ON 161925 THRU 163118 BEFORE F/A-18 AFC 70 OR 161353 THRU 161924 AFTER F/A-18 IAFC-056.

Figure 1. Fuel System Simplified Schematic (Sheet 14)

## LEGEND (Cont)

- 13 161966 AND UP; ALSO 161353 THRU 161965 AFTER F/A-18 AFC 53, VALVE REMOVED AND TRANSFER PRECHECK TUBE CAPPED AT TANK ENTRANCE.
- 14 161716 AND UP.
- 15 161353 THRU 161715.
- 16 F/A-18A
- 17 F/A-18B
- 18 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 18.
- 19 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 53.
- 20 161353 THRU 161761 BEFORE F/A-18 AFC 39.
- 21 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39.
- 22 161520 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 39.
- 23 161353 THRU 161519 BEFORE F/A-18 AFC 39.

**Figure 1. Fuel System Simplified Schematic (Sheet 15)**



## ORGANIZATIONAL MAINTENANCE

## PRINCIPLES OF OPERATION

## DESCRIPTION AND OPERATION

## REFUEL/ DEFUEL SYSTEM

## Reference Material

Plane Captain Manual .....	A1-F18AC-PCM-000
Fuel System .....	A1-F18AC-460-100
Description .....	WP003 00
Operation .....	WP003 01
Refuel/Defuel System Component Locator .....	WP006 00
Refuel/Defuel System Simplified Schematic .....	WP007 00
Inflight Refueling System Description and Operation .....	WP008 00
External Fuel System Description and Operation .....	WP009 00
Internal Fuel Transfer System Description .....	WP012 00
Internal Fuel Transfer System Simplified Schematic .....	WP014 00
Hot Fuel Recirculation System Description and Operation .....	WP018 00
Fuel Dump System Description and Operation .....	WP017 00

## Alphabetical Index

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System Description .....	1
System Controls and Indicators .....	3
Operation .....	4
Component Operation .....	4
System Operation .....	4

## Record of Applicable Technical Directives

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 AFC 39	-	No. 1 Fuel Tank Interconnect Valve Replacement and Fuel Sequencing Modification (ECP MDA-F18-00072C1)	15 Oct 86	-

## 1. DESCRIPTION.

mounted in door 8. The aircraft can also be refueled through the inflight refueling (IFR) probe (WP008 00).

2. **SYSTEM DESCRIPTION.** The aircraft fuel tanks refuel and defuel through a single point receptacle

3. Except for the IFR probe and IFR probe control switch (WP008 00), the ground and inflight refueling systems are the same.

4. The refuel/defuel line goes through fuselage tanks 1, 2, 3 and 4 and branches in tank 4 to the wings. In tank 2, the refuel line branches to the centerline external tank. The wing external tanks refuel and transfer through the wing refuel lines. In fuel tank 3, the refuel/defuel line branches to the defuel valve.

5. Each internal and external tank is prechecked before refueling to make sure refueling stops at full fuel levels.

6. Applying suction pressure to the ground refuel/defuel receptacle defuels the wings and internal tanks. The external tanks are defueled by transferring fuel to the fuselage tanks (WP009 00).

7. **SYSTEM COMPONENTS.** System components shown in WP006 00 are described and listed below.

8. **Inflight Refueling Probe Nozzle.** The inflight refuel probe nozzle is located on the IFR probe and mates with the tanker drouge to allow refueling in-flight (WP008 00).

9. **Inflight Refueling Check Valve.** The IFR check valve is mounted in the inflight refueling line. The check valve prevents reverse flow if damage to the probe occurs.

10. **Ground Refuel/Defuel Receptacle.** The ground refuel/defuel receptacle in door 8 allows single point pressure refuel/defuel of all fuel tanks. The receptacle is a standard fuel servicing receptacle and cap.

11. **Master Precheck Valve.** The master precheck valve is a manually operated valve in door 8 which prechecks the pilot valves and shutoff valves before each refueling of the aircraft, verifying correct operation.

12. **Tank Pressure/Fuel Flow Indicator.** Tank pressure/fuel flow indicator monitors fuel pressure of the internal tanks and fuel flow during ground refueling (WP003 01).

13. **Fuel Flow Sensor.** At 7 to 13 gpm, the fuel flow sensor directs fuel flow to the fuel flow indicator (WP003 01).

14. **Individual Tank Precheck Valve.** The individual tank precheck valve consists of 6 manually operated lever control valves. Each lever is used to selectively precheck pilot and shutoff valves of the internal tanks during testing or troubleshooting.

15. **Scavenge Control Valve.** The scavenge control valve allows fuel to be scavenged from the refuel/defuel line forward of tank 1 (WP003 01).

16. **Fuel Level Control Shutoff Valves.** The fuel level control shutoff valves are located in the fuselage fuel tanks (1, 2, 3 and 4). The shutoff valve opens and closes upon changes in fuel pressure from the high level pilot valve. The operation of the shutoff valves are checked during ground precheck (WP003 01).

17. **High Level Pilot Valves.** The high level pilot valves are located in the fuselage (1, 2, 3 and 4) tanks. The pilot valve is activated by a float that raises with the fuel level. When the pilot valve closes, it provides a pressure signal to the shutoff valve causing it to close (WP003 01).

18. **Wing High Level Refuel/Defuel Pilot Valve.** The wing high level refuel/defuel pilot valves are located in the wing tanks. The pilot valve is activated by a float that raises with the fuel level. When the pilot valve closes, it provides a pressure signal to the shutoff valve causing it to close. During defuel, a check valve, inside the pilot valve, prevents premature closing of the shutoff valve (WP003 01).

19. **Wing Refuel Lockout Valve.** When energized, the wing refuel lockout valve inhibits refueling of the wings.

20. **Wing Refuel/Defuel Shutoff Valve.** The wing refuel/defuel shutoff valve opens and closes upon changes in fuel pressure from the wing high level refuel/defuel pilot valve and wing low level refuel/defuel pilot valve. The operation of the shutoff valves are checked during ground precheck (WP003 01).

21. **Strainer - 161735 AND UP.** The strainer is located over the inlet of the refuel/defuel line in the wing. During defuel the strainer prevents foreign objects from entering fuel system components.

**22. Wing Low Level Refuel/ Defuel Pilot Valve.** When the wing is defueled, the low level re-fuel/defuel pilot valve causes the refuel/defuel shutoff valve to close. The pilot valve has a spool type float (WP003 01).

**23. Refuel/Defuel Shutoff Valve.** The tank 1 re-fuel/defuel shutoff valve prevents back flow from the fuel tanks to the refuel/defuel line forward of tank 1. This prevents fuel from collecting in the forward fuselage area if the refuel/defuel line is damaged. The refuel/defuel shutoff valve has an integral fuel pressure port and vent port (WP003 01).

**24. Pressure Operated Interconnect Valve.** The pressure operated interconnect valves are located in tanks 1, 2 and 3 and are closed by motive flow pressure. If motive flow pressure is lost, the interconnect valves open and allow gravity transfer of fuel to the feed tanks (WP003 01).

**25. Gravity Feed Check Valve.** The gravity feed check valve operates as a free swinging flapper valve which allows fuel to flow from the transfer tanks to the feed tanks. It does not allow fuel flow in the opposite direction, out of the feed tanks.

**26. Refueling Manifold Scavenge Jet Ejector.** The refueling manifold scavenge jet ejector in tank 2 continuously scavenges the refuel/defuel line forward of tank 1.

**27. Defuel Valve.** The defuel valve is a float/flapper valve located in tank 3. During defueling, fuel is drawn from the tanks by defuel suction pressure through the valve. The valve is closed by motive flow pressure during internal transfer and by refueling pressure during refueling (WP003 01).

**28. External Tank Refuel/Transfer Shutoff Valve.** The refuel/transfer shutoff valve (WP009 00) controls refueling and transfer of the external fuel tank.

**29. External Tank Fuel Level Control Pilot Valve.** The fuel level control pilot valve (WP009 00) controls the opening and closing of the refuel/transfer shutoff valve. An integral electrical solenoid is used for electrical precheck.

**30. External Tank Manual Precheck Valve.** The manual precheck valve (WP009 00) prechecks the external tank fuel level control pilot valve and refuel/

transfer shutoff valve when refueling without electrical power.

**31. Automatic Drain Valve.** The automatic drain valve in tank 4 is a double acting poppet valve that allows fuel and condensation in the refuel/defuel and wing transfer lines to drain into tank 4.

**32. Refuel/Transfer Check Valves.** The refuel/transfer check valves prevents back flow into the re-fuel/defuel system during transfer (WP012 00). Back flow would cause the fuel level control shutoff valves to close, stopping fuel transfer.

**33. Refuel Scavenge Line Pressure Transducer.** Used in testing and troubleshooting, the refuel scavenge line pressure transducer measures the suction pressure of the scavenge jet ejector, in tank 2, when motive flow pressure is applied.

**34. Wing Fuel Coupling Valves.** Each wing fuel coupling valve acts as a check valve that prevents fuel flow when pylon is not installed.

**35. Wing Air Coupling Valve.** Each wing air coupling valve acts as a check valve that prevents regulated air flow when pylon is not installed.

**36. SYSTEM CONTROLS AND INDICATORS.** The refuel/defuel system controls and indicators are listed below.

**37. Fuel Check Panel.** The fuel check panel in door 8 is used to select readings of internal and external fuel tanks during ground operations. The switches and indicators are listed below:

a. On 161353 THRU 161761 BEFORE F/A-18 AFC 39;

TK INTCON V CHK switch  
L EXT FTK CHK switch  
C EXT FTK CHK switch  
R EXT FTK CHK switch  
TK 3V POS indicator light  
TK 2V POS indicator light

b. On 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39;

TK INTCON V CHK switch  
TK 1V POS indicator light  
TK 2V POS indicator light

TK 3V POS indicator light  
EXT TK PRCHK SW

38. For detailed description of TK INTCON V CHK switch, TK 1V POS, TK 2V POS, and TK 3V POS indicator lights, see WP012 00.

39. EXT TK PRCHK SW - 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39. During ground refueling with electrical power, the EXT TK PRCHK SW simultaneously prechecks all the external tanks at the shutoff valves (WP003 01).

40. L/R/C EXT FTK CHK Switch - 161353 THRU 161761 BEFORE F/A-18 AFC 39. During ground refueling, with electrical power the L/R/C EXT FTK CHK switches individually precheck external tanks at the shutoff valves.

41. **Exterior Lights (EXT LT) Control Panel.** The INTR WING switch is located on the EXT LT control panel. When this switch is set to INHIBIT, the below occurs:

a. Wing damage shutoff valve is energized closed, stopping wing transfer (WP012 00).

b. Wing refuel lockout valve is energized open to prevent wing refueling (this WP).

c. Wing diverter valves deenergize and directs fuel to the feed tanks (WP018 00).

42. **FUEL System Control Panel.** The FUEL system control panel consists of the switches listed below:

a. EXT TANKS - WING switch (WP009 00)

b. EXT TANKS - CTR switch (WP009 00)

c. PROBE control switch (WP008 00)

d. DUMP switch (WP017 00)

43. **Tank Pressure/Fuel Flow Indicator.** Tank pressure/fuel flow indicator is used to monitor fuel pressure of the internal tanks and fuel flow during ground refueling. Normal pressure is displayed as green and indicated in pounds per square inch (psi). Overpressurization is displayed in red with the word STOP. The fuel flow indicator is turbine driven and rotates when fuel flow is 7 to 13 gallons per minute or greater (WP003 01).

## 44. OPERATION.

45. **COMPONENT OPERATION.** Detailed operational descriptions are given in WP003 01 for components listed below:

a. Defuel Valve

b. External Tank Refuel/Transfer Shutoff Valve and Fuel Level Control Pilot Valve

c. Fuel Level Control Shutoff Valve and High Level Pilot Valve

d. Inflight Refueling Probe

e. Pressure Operated Interconnect Valves

f. Tank Pressure/Fuel Flow Indicator and Fuel Flow Sensor

g. Wing Refuel/Defuel Shutoff, High Level Pilot and Low Level Pilot Valves

h. Refuel/Defuel Shutoff Valve

i. Scavenge Control Valve

46. **Wing Refuel Lockout Valve.** The wing refuel lockout valve is energized open through the EXT LT control panel (WP003 00). In case of battle damage to the wing, the pilot can select INHIBIT on the EXT LT control panel and stop refueling of the wings.

47. **Refueling Manifold Scavenge Jet Ejector.** The refueling manifold scavenge jet ejector is located in tank 2. Motive flow pressure from the left motive flow boost pump induces a flow through the ejector which scavenges fuel from the refuel/defuel line forward of tank 1. The ejector continuously scavenges fuel from the refuel/defuel line unless refuel pressure is applied. Scavenged fuel is discharged into tank 2.

48. **SYSTEM OPERATION.** A simplified schematic in WP007 00 shows refuel/defuel system interface and a component locator is in WP006 00. Fuel system indicators are mounted in door 8 to allow monitoring of fuel system operation.

49. **Refueling.** Refueling can be done with or without electrical power (A1-F18AC-PCM-000). When fuel servicing pressure (20 - 55 psi) is applied, fuel passes through the refuel/defuel shutoff valve

in tank 1 and enters the internal tanks through the fuel level control shutoff valves. Fuel enters the external tanks through refuel/transfer shutoff valves (WP009 00). As each tank fills, a high level pilot valve closes, causing a shutoff valve to close. Refueling automatically stops when all pilot valves have closed their respective shutoff valves.

50. The tank pressure/fuel flow indicator displays fuel flow during refueling. The indicator also senses pressure in the fuselage tanks during refueling.

51. A fuel flow sensor, mounted directly downstream from the ground refuel/defuel receptacle, routes fuel to the tank pressure/fuel flow indicator in door 8. The mechanic can monitor fuel flow during fueling and precheck by watching the indicator.

52. If vent system becomes blocked, the pressure in the internal fuel tanks causes the tank pressure indicator (door 8) to move to the unsafe (red) area and show the word STOP.

53. **Master Precheck.** A precheck of the fuel level control shutoff valves is done before each refueling of the aircraft. During precheck, full fuel tanks are simulated by filling the high level pilot valve float bowl with fuel or, by mechanically raising the float (WP003 01). This is done by setting the master precheck valve handle in door 8 to UP PRECHECK.

54. On 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39, the FUEL CHECK PANEL in door 8 has an EXT TK PRCHK SW that simultaneously prechecks the external fuel tanks (WP009 00). Each external fuel tank also has a manual precheck valve for prechecking without electrical power.

55. On 161353 THRU 161761 BEFORE F/A-18 AFC 39 the FUEL CHECK PANEL in door 8 has three EXT FTK CHK switches which electrically prechecks each external fuel tank (WP009 00). Each external fuel

tank also has a manual precheck valve for prechecking without electrical power.

56. The individual tank precheck valve (doors 141L/R) will selectively refuel internal tanks during testing or troubleshooting. The six levers of the precheck valve are normally up (open). When the handles are pulled down (closed), precheck pressure is stopped allowing the tank to refuel when in master precheck.

57. **Wing Inhibited Refueling.** When refueling on the ground with electrical power, refueling of the wings can be prevented by setting the EXT LT control panel INTR WING switch to INHIBIT.

58. Setting the INTR WING switch to INHIBIT, energizes the wing refuel lockout valve, allowing refuel pressure a path to the wing refuel/defuel pilot valves. The pilot valves then close the wing refuel/defuel shutoff valves preventing refueling. Switching to INHIBIT also energizes the wing damage shutoff valve (WP014 00) to the closed position, preventing wing fuel transfer. The INHIBIT position also deenergizes wing diverter valves directing hot fuel recirculation flow to the fuselage feed tanks instead of the wings.

59. **Defueling.** Applying suction pressure at the refuel/defuel receptacle defuels the aircraft. Suction pressure opens the defuel valve in tank 3 and the wing ground refuel/defuel shutoff valves in each wing.

60. When the wings empty, the wing refuel/defuel low level pilot valves close the wing refuel/defuel shutoff valves, preventing the servicing hose from sucking air. Fuselage fuel gravity flows into tank 3 through the interconnect valves (WP012 00). Defueling continues through the defuel valve until the fuel level depletes below the defuel valve float.

61. The external tanks are normally defueled by transferring fuel into the internal fuel tanks by using an external air source (WP009 00).



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**ORGANIZATIONAL MAINTENANCE****PRINCIPLES OF OPERATION****COMPONENT LOCATOR****REFUEL/DEFUEL SYSTEM**

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**Reference Material**

None

**Alphabetical Index****Subject****Page No.**

Refuel/Defuel System Component Locator, Figure 1 ..... 2

**Record of Applicable Technical Directives**

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 AFC 53	-	Elimination of Tanks 1 and 4 Sneak Circuit, Tank 4 Motive Flow Shutoff Valve, and Raised Inverted Baffle (ECP MDA-F/A-18-00055)	15 Jun 86	-
F/A-18 AFC 41	-	Installation of Equipment, Structure, Wiring and Attaching Hardware (ECP MDA F/A-18-00054C1)	1 Nov 86	-
F/A-18 AFC 39	-	No. 1 Fuel Tank Interconnect Valve Replace- ment and Fuel Sequencing Modification (ECP MDA-F/A-18-00072C1)	1 Nov 86	-

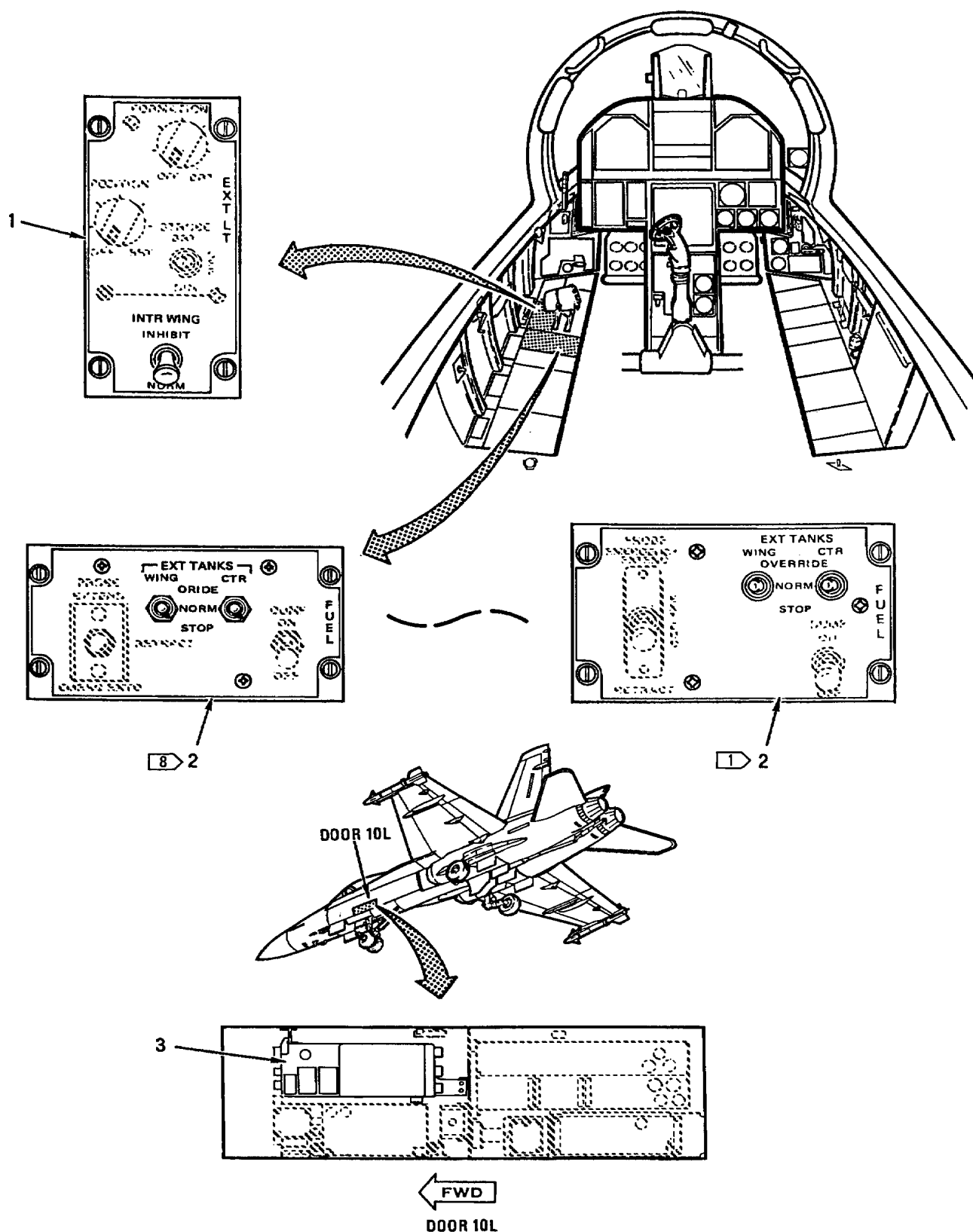


Figure 1. Refuel/Defuel System Component Locator (Sheet 1)



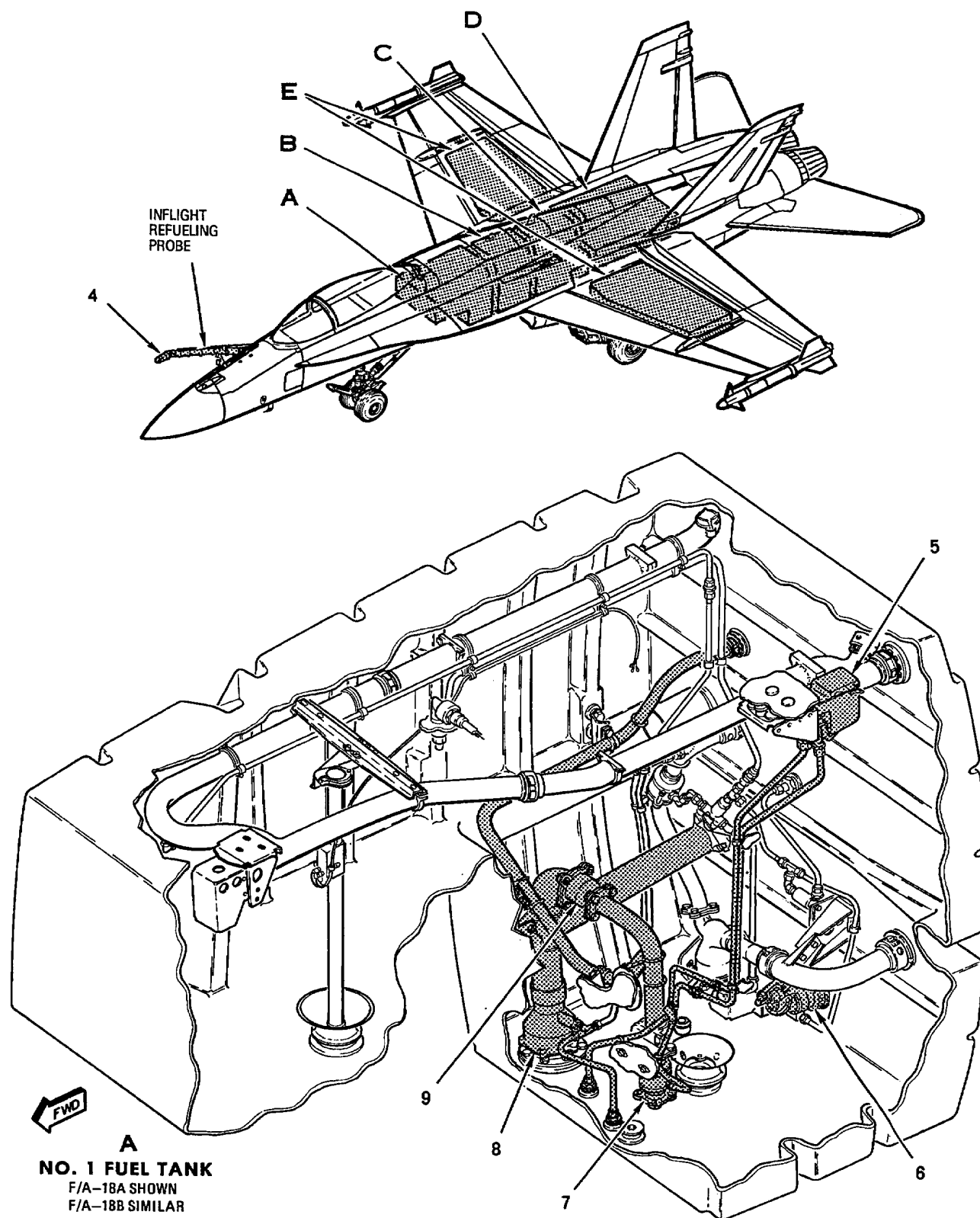


Figure 1. Refuel/Defuel System Component Locator (Sheet 2)

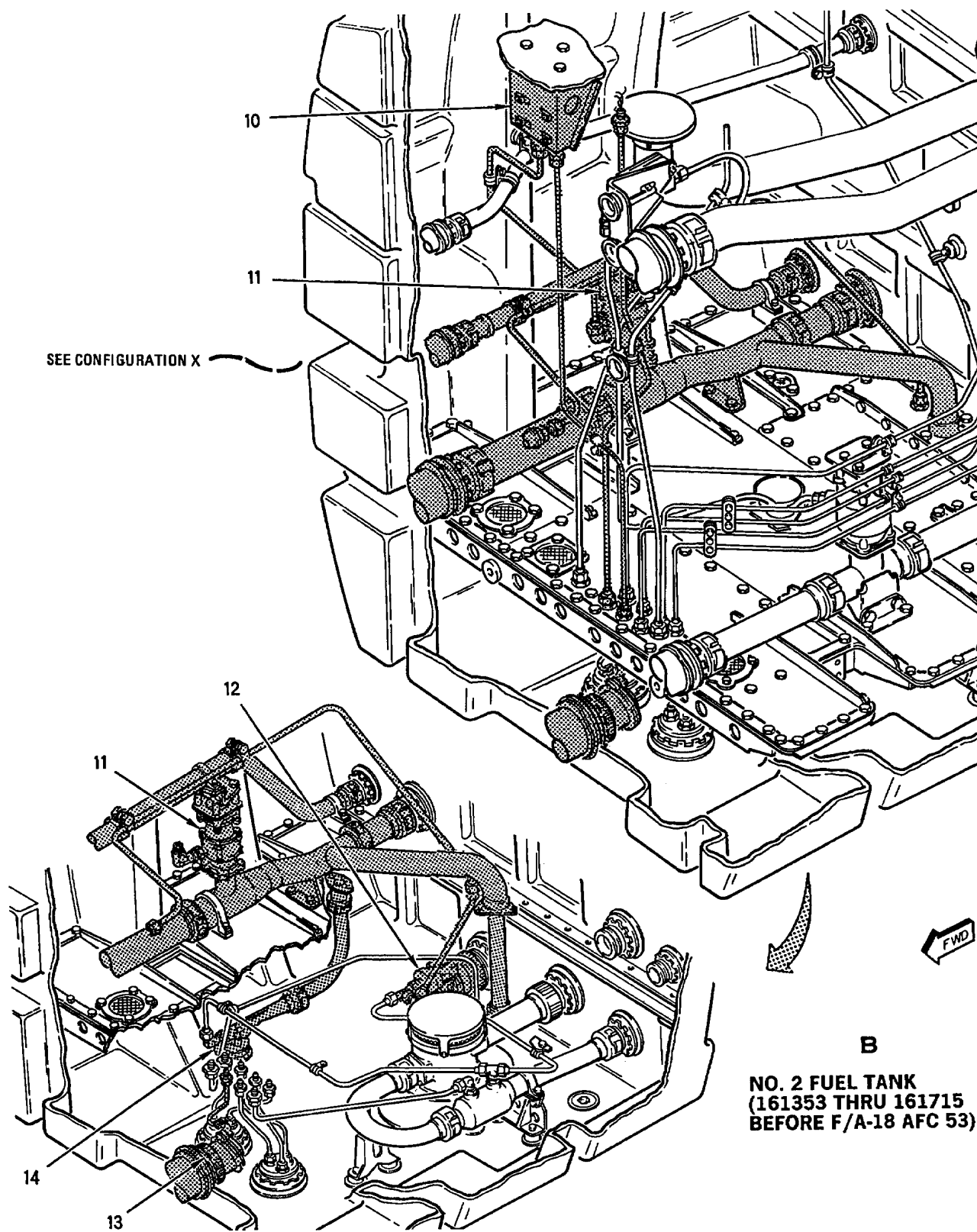
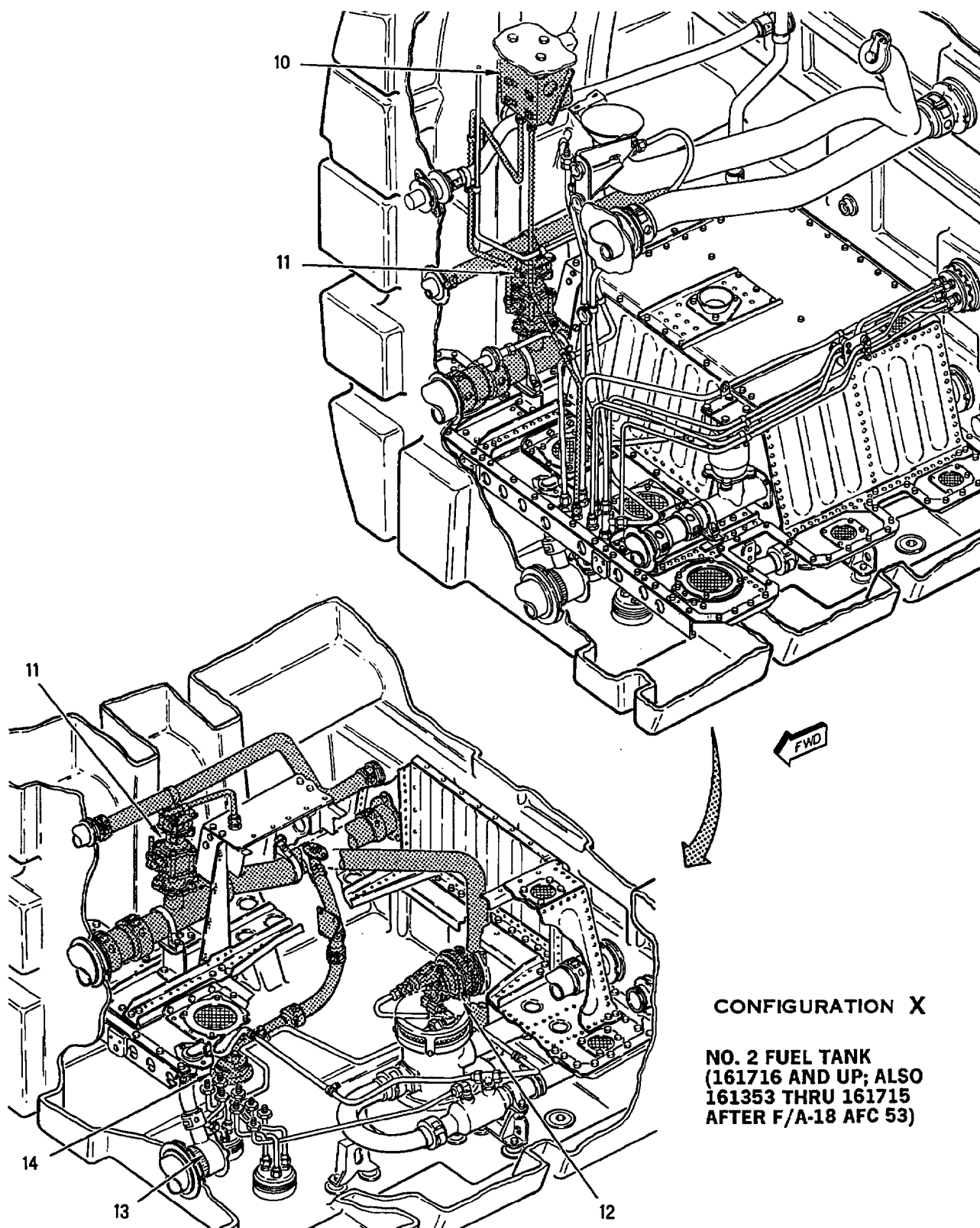


Figure 1. Refuel/Defuel System Component Locator (Sheet 3)



18AC-460-10-(2-4)22

**Figure 1. Refuel/Defuel System Component Locator (Sheet 4)**

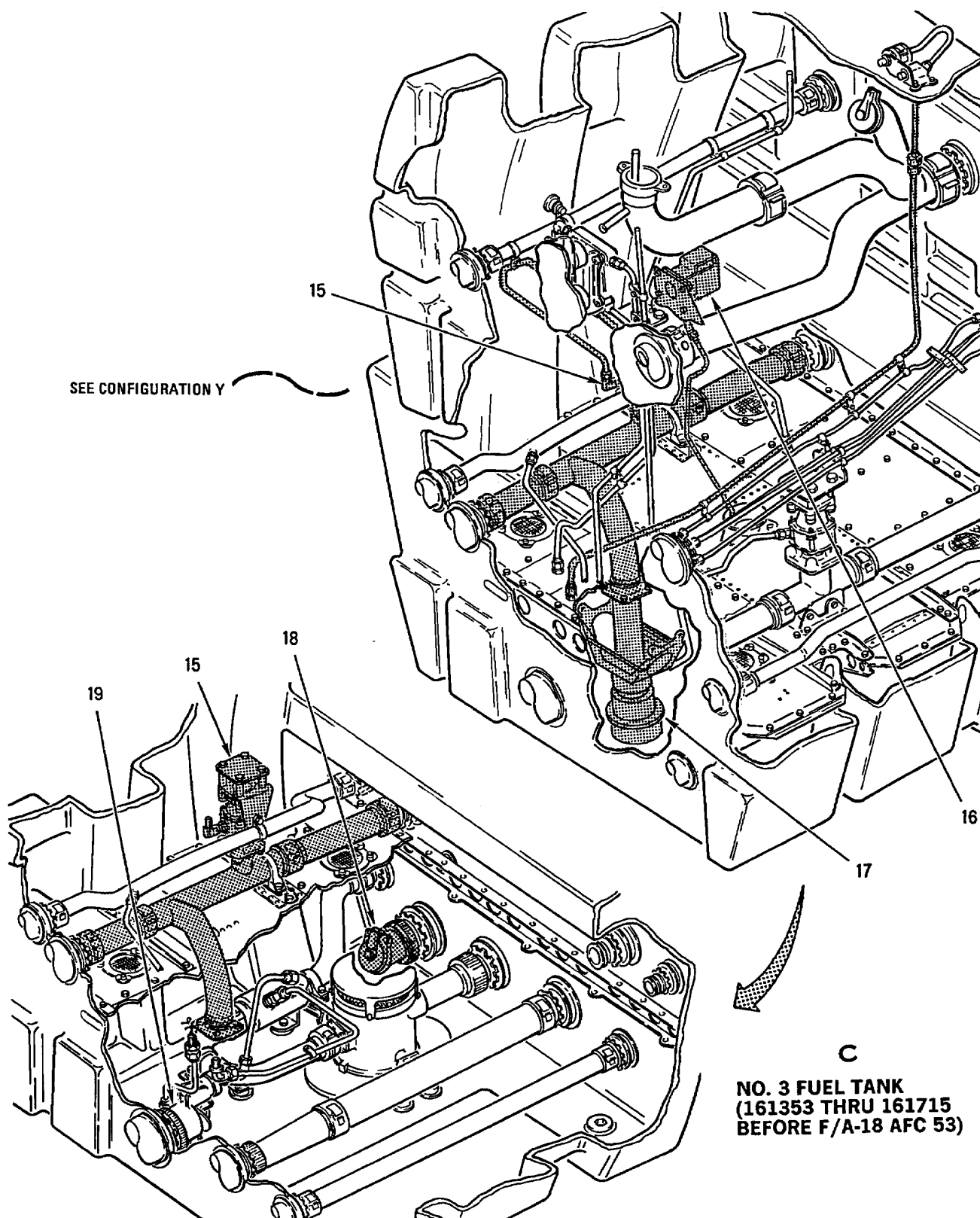
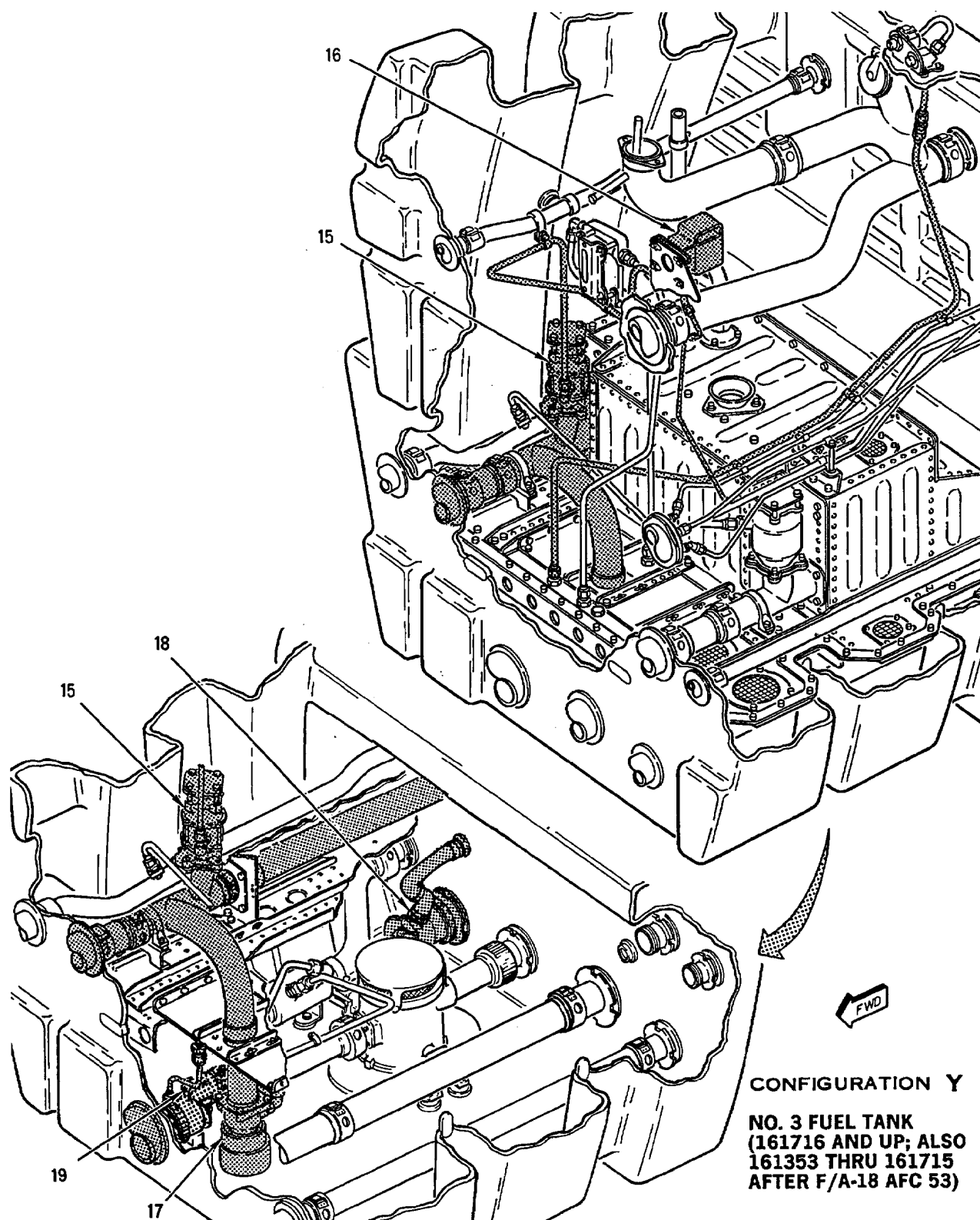


Figure 1. Refuel/Defuel System Component Locator (Sheet 5)



18AC-460-10-(2-6)22

Figure 1. Refuel/Defuel System Component Locator (Sheet 6)

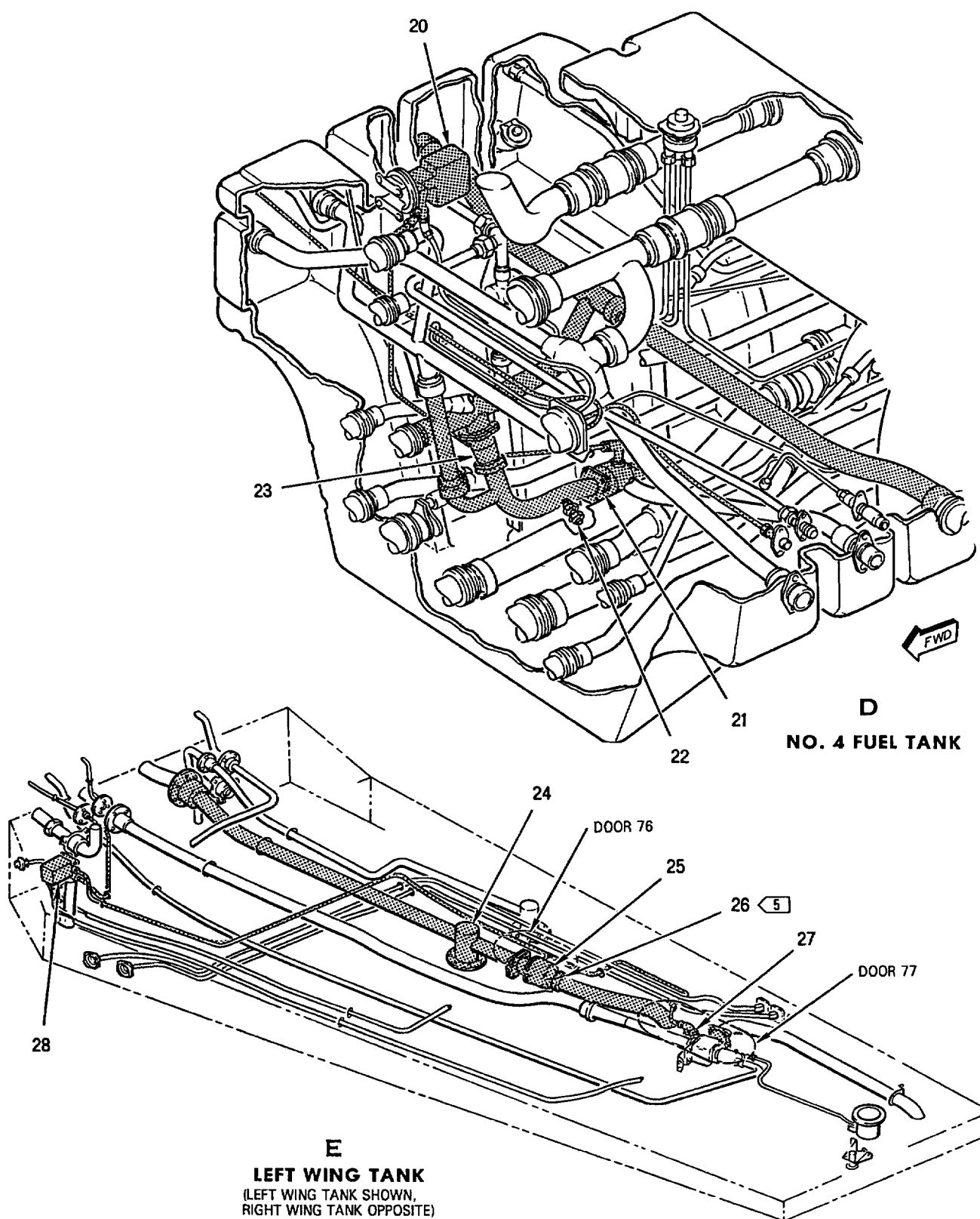


Figure 1. Refuel/Defuel System Component Locator (Sheet 7)

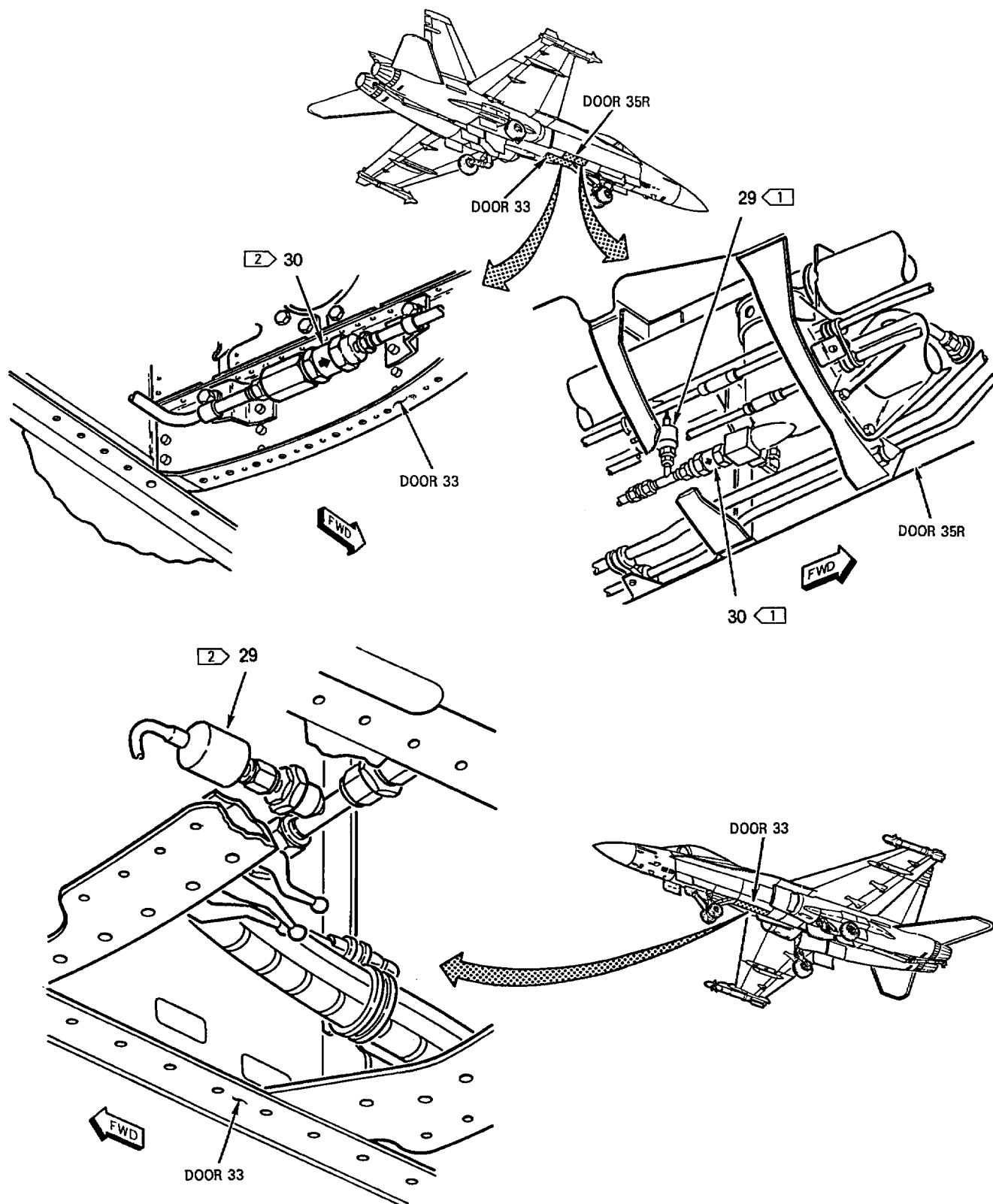


Figure 1. Refuel/Defuel System Component Locator (Sheet 8)

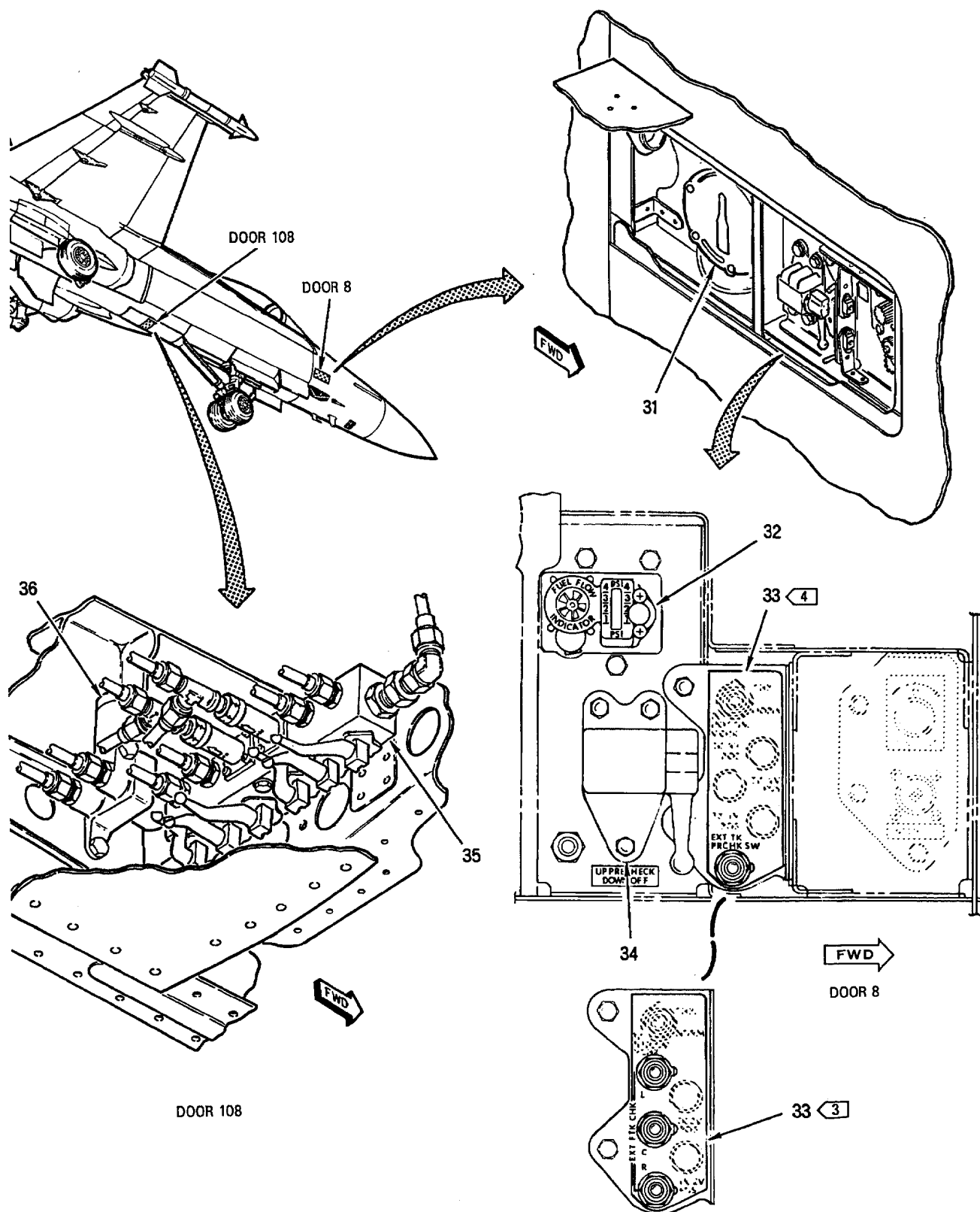


Figure 1. Refuel/Defuel System Component Locator (Sheet 9)



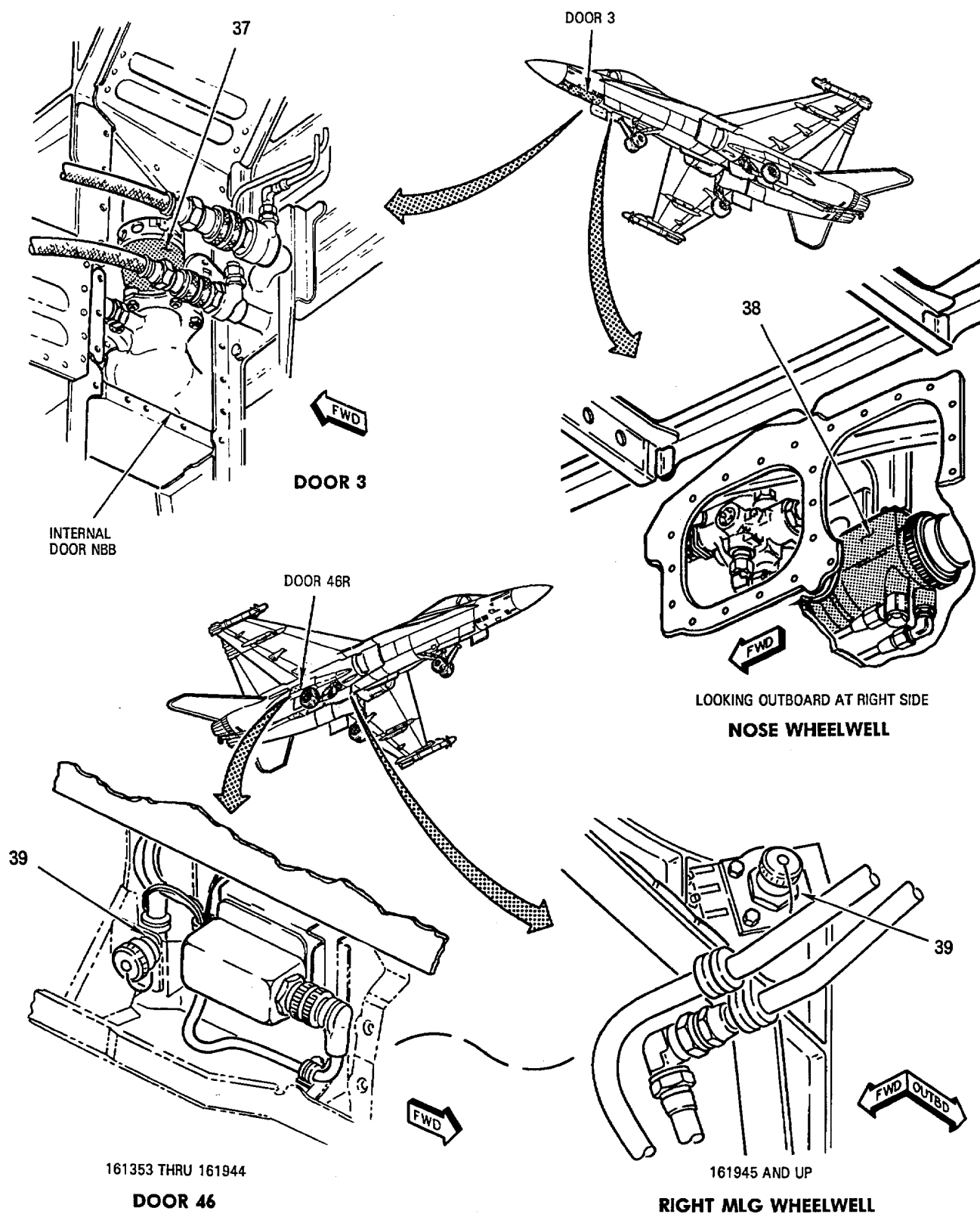
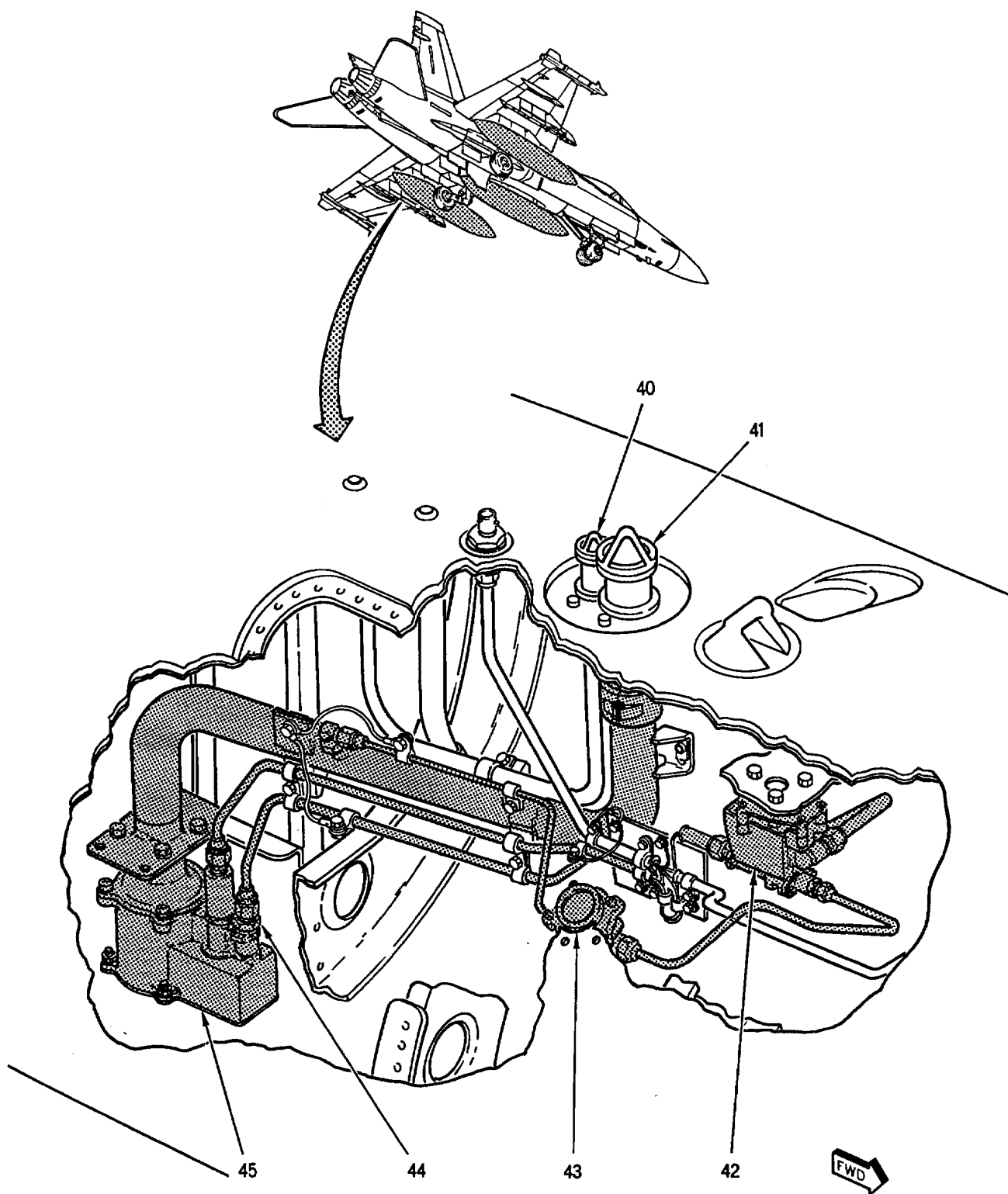


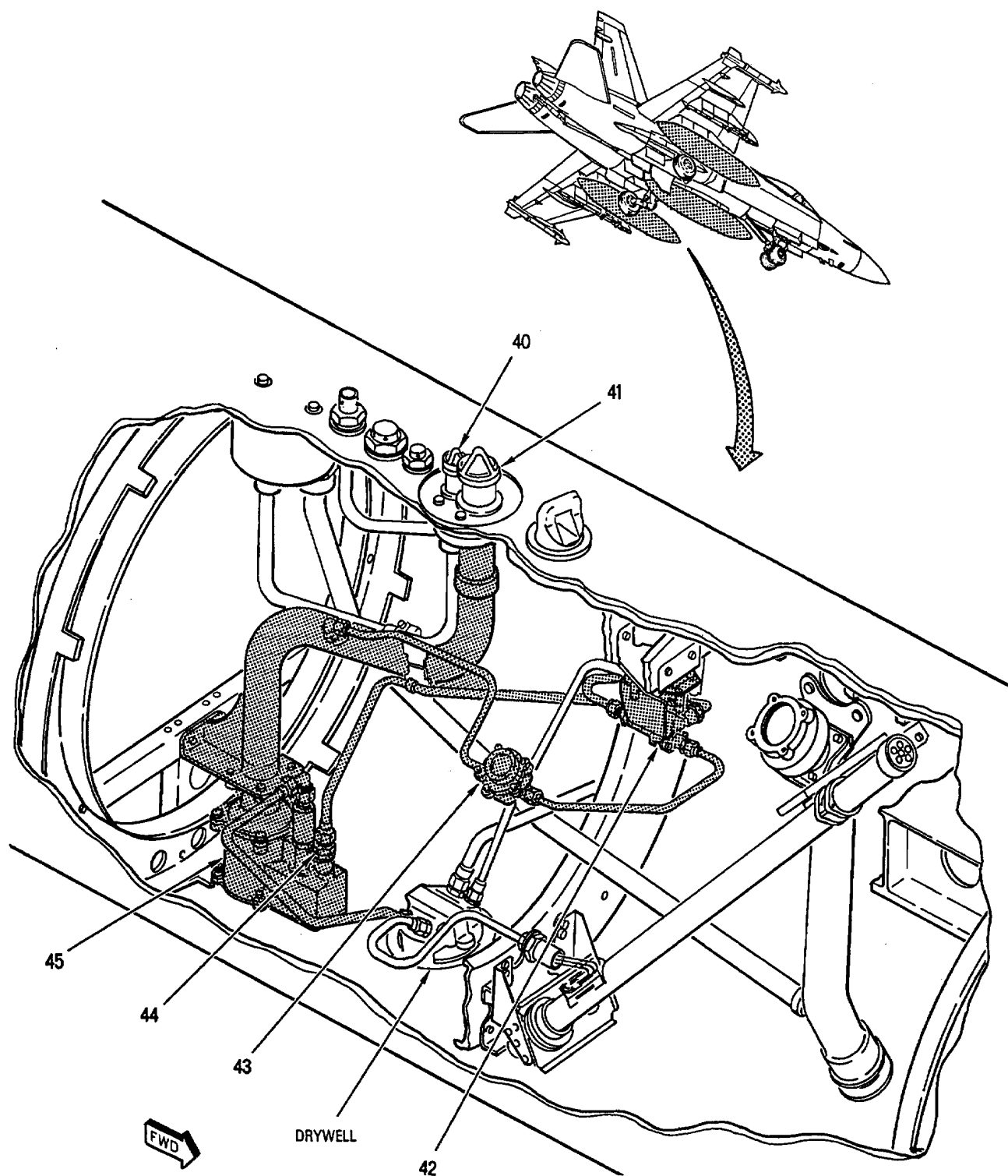
Figure 1. Refuel/Defuel System Component Locator (Sheet 10)



**AIRCRAFT FUEL TANK FPU-6/A (ELLIPTICAL)**

**Figure 1. Refuel/Defuel System Component Locator (Sheet 11)**

18AC-460-10-(2-11)22



**AIRCRAFT FUEL TANK FPU-8/A (CYLINDRICAL)**

**Figure 1. Refuel/Defuel System Component Locator (Sheet 12)**

18AC-460-10-(2-12)22

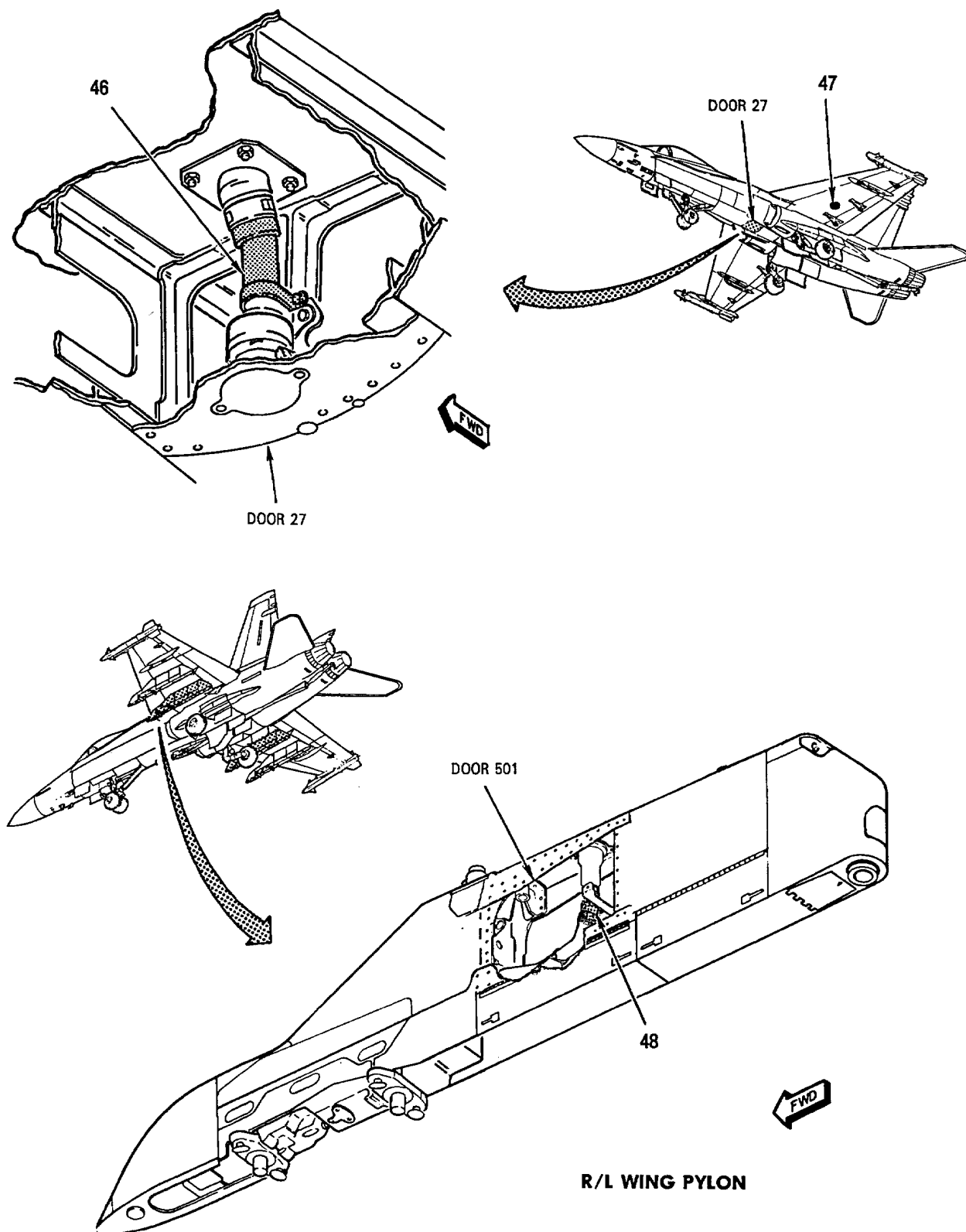


Figure 1. Refuel/Defuel System Component Locator (Sheet 13)

## LEGEND

1	161353 THRU 161528 BEFORE F/A-18 AFC 41.
2	161702 AND UP.
3	161353 THRU 161761 BEFORE F/A-18 AFC 39.
4	161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39.
5	161735 AND UP.
6	161353 THRU 161761 BEFORE F/A-18 AFC 39.
7	161924 AND UP; 161353 THRU 161761 AFTER F/A-18 AFC 39.
8	161702 AND UP; ALSO 161353 THRU 161528 AFTER F/A-18 AFC 41.

NOMENCLATURE	INDEX NO.	REF DES
DEFUEL VALVE	17	5VAP521
EXTERNAL FUEL TANK		
FUEL LEVEL CONTROL PILOT VALVE	42	5L-Y060
MANUAL PRECHECK VALVE	43	5VAY631
REFUEL/TRANSFER CHECK VALVE	44	5VAY688
REFUEL/TRANSFER SHUTOFF VALVE	45	5L-Y061
TO PYLON AIR PROBE	40	5VAY642
TO PYLON FUEL PROBE	41	5VAY637
EXT LT CONTROL PANEL ASSEMBLY	1	52A-H091
INTR WING SWITCH		5S-H026
FLAME ARRESTOR		
CENTERLINE PYLON	46	5VAR525
WING PYLON	48	5VAW673
FUEL CHECK PANEL	33	5A-B019
3 L EXT FTK CHK SWITCH		5S-B022
3 C EXT FTK CHK SWITCH		5S-B021
3 R EXT FTK CHK SWITCH		5S-B020
4 EXT TK PRCHK SW		5S-B020
FUEL FLOW SENSOR	38	5VAD645
FUEL GROUND TEST RECEPTACLE	39	5J-R135
FUEL SYSTEM CONTROL PANEL	2	5A-H072
EXT TANKS CTR SWITCH		5S-H018
EXT TANKS WING SWITCH		5S-H017

Figure 1. Refuel/Defuel System Component Locator (Sheet 14)


NOMENCLATURE	INDEX NO.	REF DES
GROUND REFUEL/DEFUEL RECEPTACLE	31	5VAD626
INDIVIDUAL TANK PRECHECK VALVE	35	5VAF627
INFLIGHT REFUELING CHECK VALVE	37	5VAB613
INFLIGHT REFUELING PROBE NOZZLE	4	5VAB526
MASTER PRECHECK VALVE	34	5VAD624
NO. 1 FUEL TANK FUEL LEVEL CONTROL SHUTOFF VALVE	7	5VAP541
NO. 1 FUEL TANK HIGH LEVEL PILOT VALVE	5	5VAP539
NO. 1 FUEL TANK PRESSURE OPERATED INTERCONNECT VALVE	6	5VAP538  5S-E172
NO. 1 FUEL TANK REFUEL/TRANSFER CHECK VALVE	9	5VAP532
NO. 2 FUEL TANK FUEL LEVEL CONTROL SHUTOFF VALVE	11	5VAP596
NO. 2 FUEL TANK HIGH LEVEL PILOT VALVE	10	5VAP594
NO. 2 FUEL TANK GRAVITY FEED CHECK VALVE	13	5VAP600
NO. 2 FUEL TANK PRESSURE OPERATED INTERCONNECT VALVE	12	5S-R132
NO. 3 FUEL TANK FUEL LEVEL CONTROL SHUTOFF VALVE	15	5VAP610
NO. 3 FUEL TANK HIGH LEVEL PILOT VALVE	16	5VAP583
NO. 3 FUEL TANK GRAVITY FEED CHECK VALVE	18	5VAP608
NO. 3 FUEL TANK PRESSURE OPERATED INTERCONNECT VALVE	19	5S-R131
NO. 4 FUEL TANK AUTOMATIC DRAIN VALVE	22	5VAP568
NO. 4 FUEL TANK FUEL LEVEL CONTROL SHUTOFF VALVE	21	5VAP569
NO. 4 FUEL TANK HIGH LEVEL PILOT VALVE	20	5VAP556
NO. 4 FUEL TANK REFUEL/TRANSFER CHECK VALVE	23	5VAP557

Figure 1. Refuel/Defuel System Component Locator (Sheet 15)

NOMENCLATURE	INDEX NO.	REF DES
NO. 8 CIRCUIT BREAKER/RELAY PANEL ASSEMBLY	3	52A-C159
EXT FUEL TK CONT CIRCUIT BREAKER (ZONE A8)		5CBC016
4 EXTERNAL TANK PRECHECK RELAY		5K-C168
EXTERNAL TANK REFUEL CONTROL RELAY		5K-C107
FUEL LOW LEVEL RELAY NO. 2 WING FUEL		5K-C052
CIRCUIT BREAKER (ZONE A7)		5CBC115
REFUEL/DEFUEL SHUTOFF VALVE	8	5VAP533
REFUEL SCAVENGE LINE PRESSURE TRANSDUCER	29	5MTF140
REFUELING MANIFOLD SCAVENGE JET EJECTOR	14	5BAP598
SCAVENGE CONTROL VALVE	30	5VAD622
5 STRAINER	26	
LEFT		5FAU683
RIGHT		5FAV684
TANK PRESSURE/FUEL FLOW INDICATOR	32	5DSD625
WING AIR COUPLING VALVE	47	
LEFT		5VAU577
RIGHT		5VAV578
WING FUEL COUPLING VALVE	24	
LEFT		5VAU575
RIGHT		5VAV576
WING HIGH LEVEL REFUEL/DEFUEL PILOT VALVE	28	
LEFT		5VAU573
RIGHT		5VAV574
WING LOW LEVEL REFUEL/DEFUEL PILOT VALVE	27	
LEFT		5VAU551
RIGHT		5VAV552
WING REFUEL/DEFUEL SHUTOFF VALVE	25	
LEFT		5VAU553
RIGHT		5VAV554
WING REFUEL LOCKOUT VALVE	36	5L-116

Figure 1. Refuel/Defuel System Component Locator (Sheet 16)





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**ORGANIZATIONAL MAINTENANCE****PRINCIPLES OF OPERATION****SIMPLIFIED SCHEMATIC****REFUEL/DEFUEL SYSTEM**

---

**Reference Material**

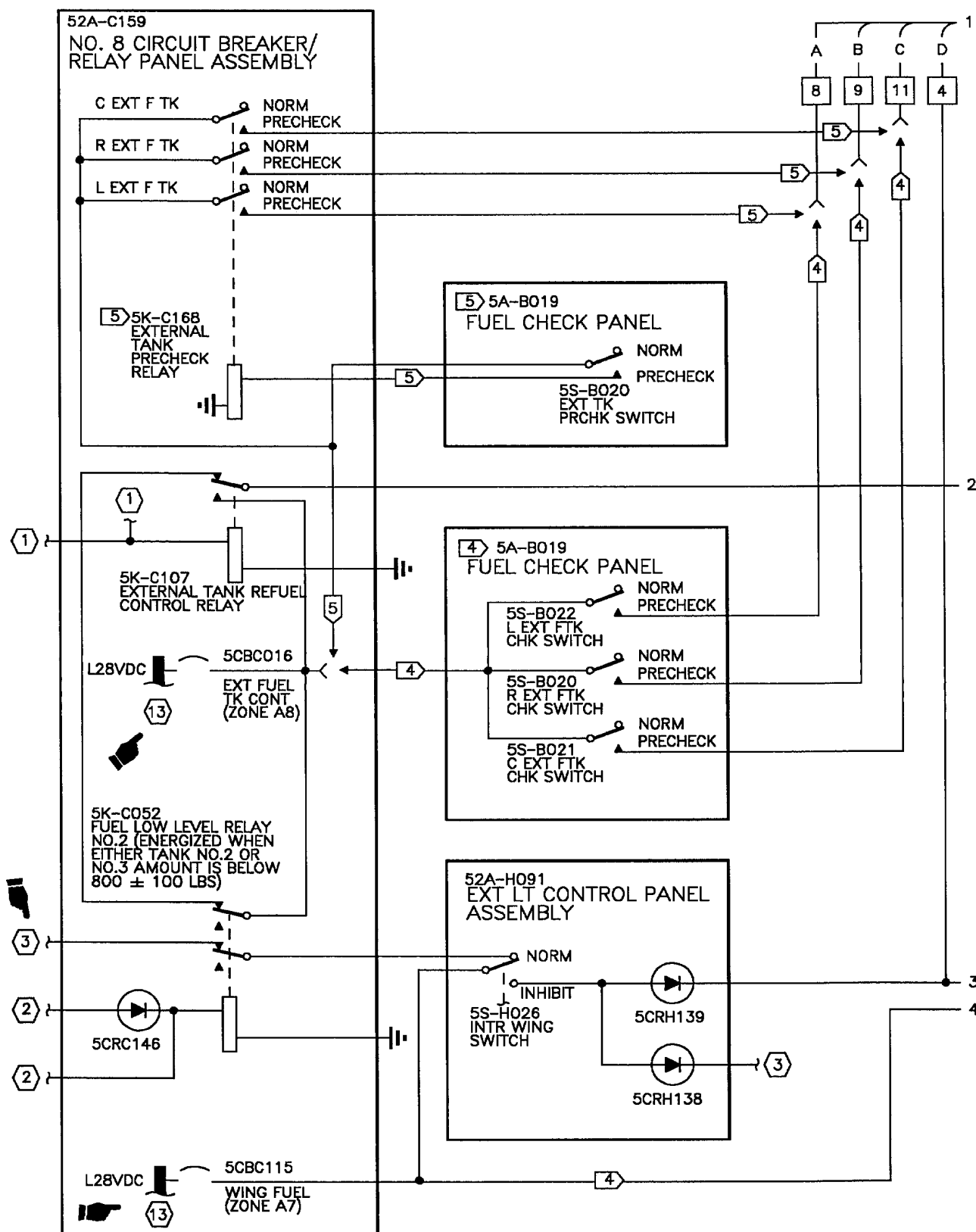
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**Alphabetical Index****Subject****Page No.**

Refuel/Defuel System Simplified Schematic, Figure 1 ..... 2

**Record of Applicable Technical Directives**

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 AFC 39	-	No. 1 Fuel Tank Interconnect Valve Replacement and Fuel Sequencing Modification (ECP MDA-F/A-18-00072C1)	1 Nov 86	-
F/A-18 AFC 53	-	Elimination of Tanks 1 and 4 Sneak Circuit, Tank 4 Motive Flow Shutoff Valve and Raised Inverted Baffle (ECP MDA-F/A-18-00055)	1 Nov 86	-



18AC-460-10-(22-1)22-CAT1

Figure 1. Refuel/Defuel System Simplified Schematic (Sheet 1)



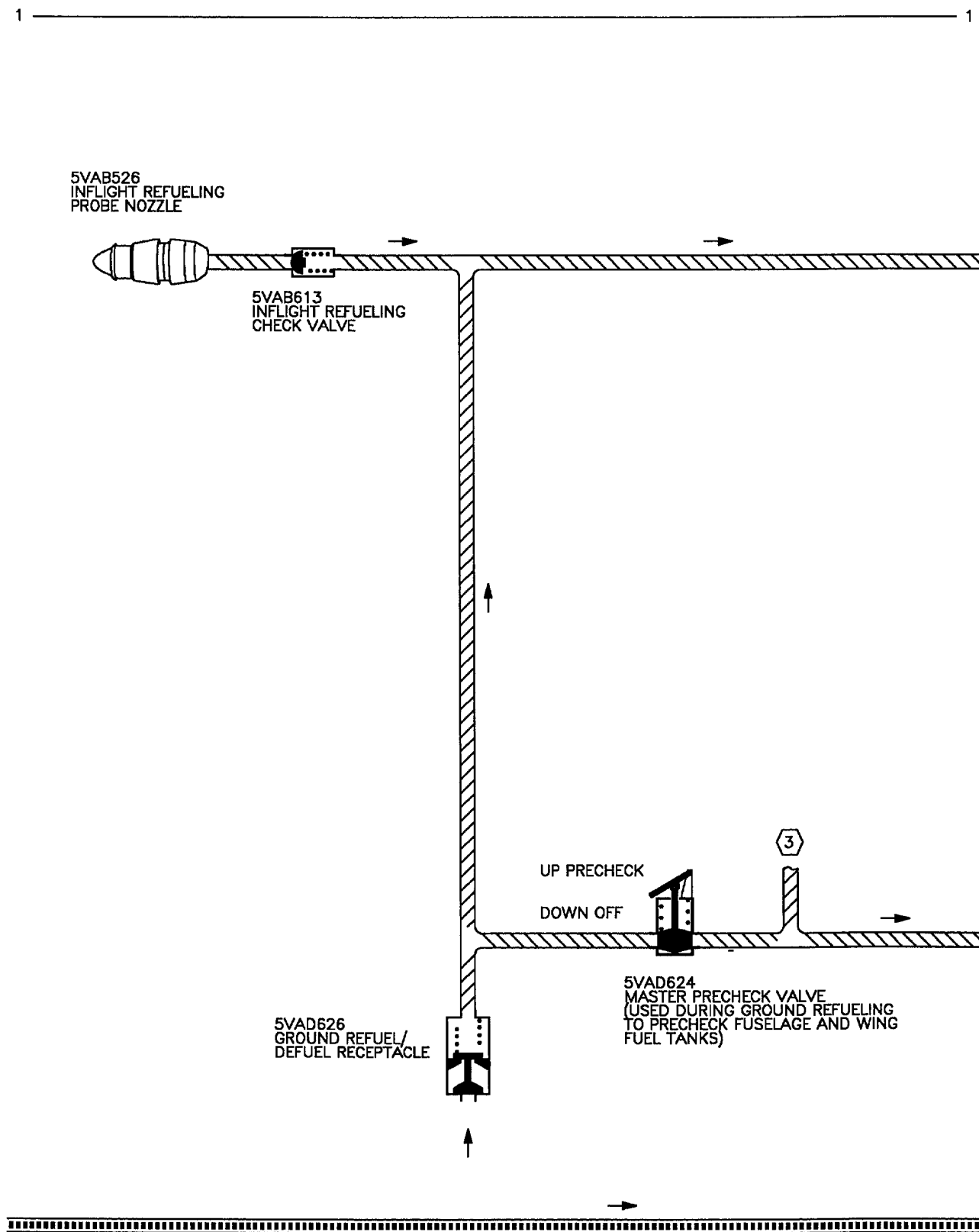
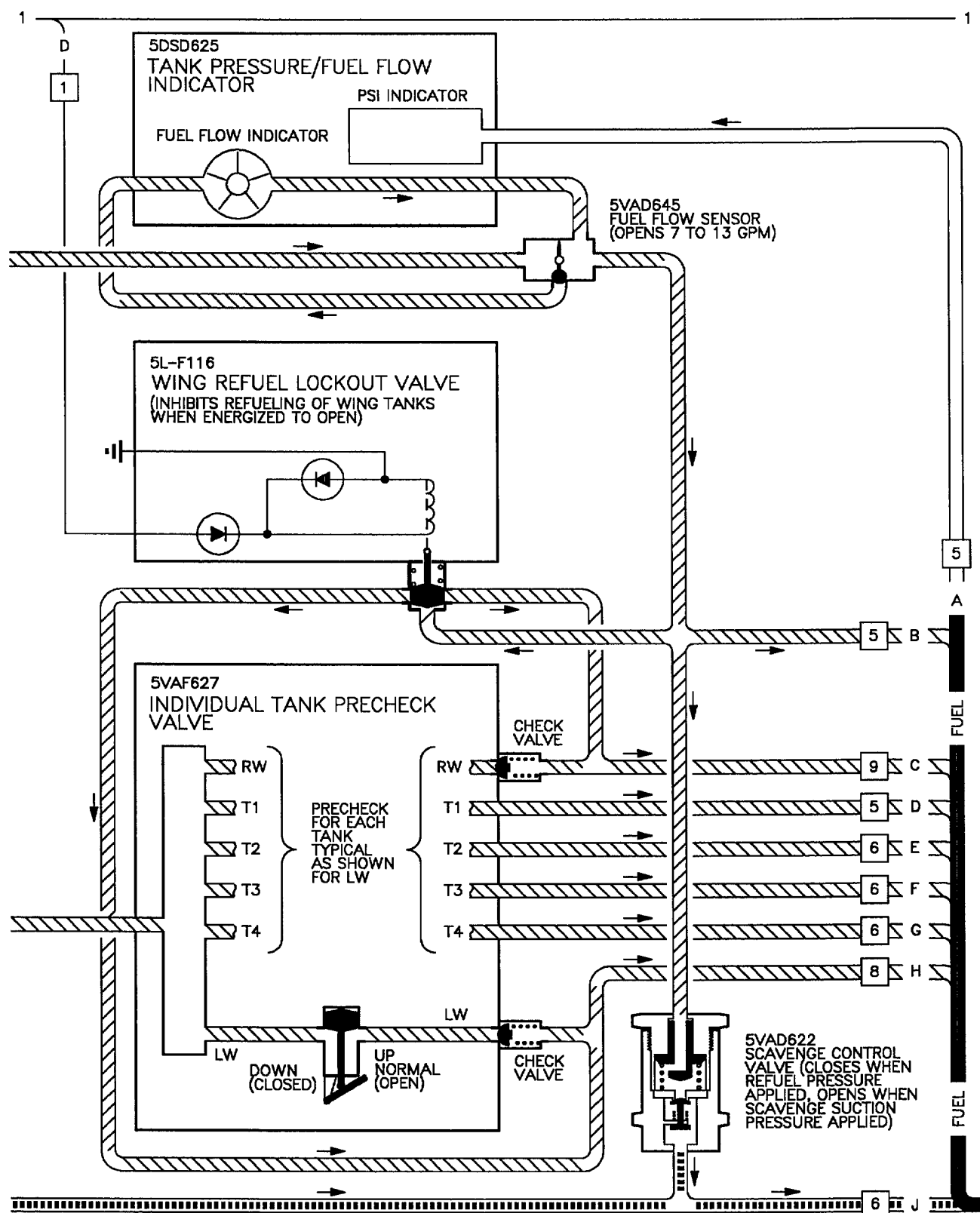


Figure 1. Refuel/Defuel System Simplified Schematic (Sheet 3)

18AC-460-10-(22-3)H-CATI



18AC-460-10-(22-4)H-CATI

Figure 1. Refuel/Defuel System Simplified Schematic (Sheet 4)

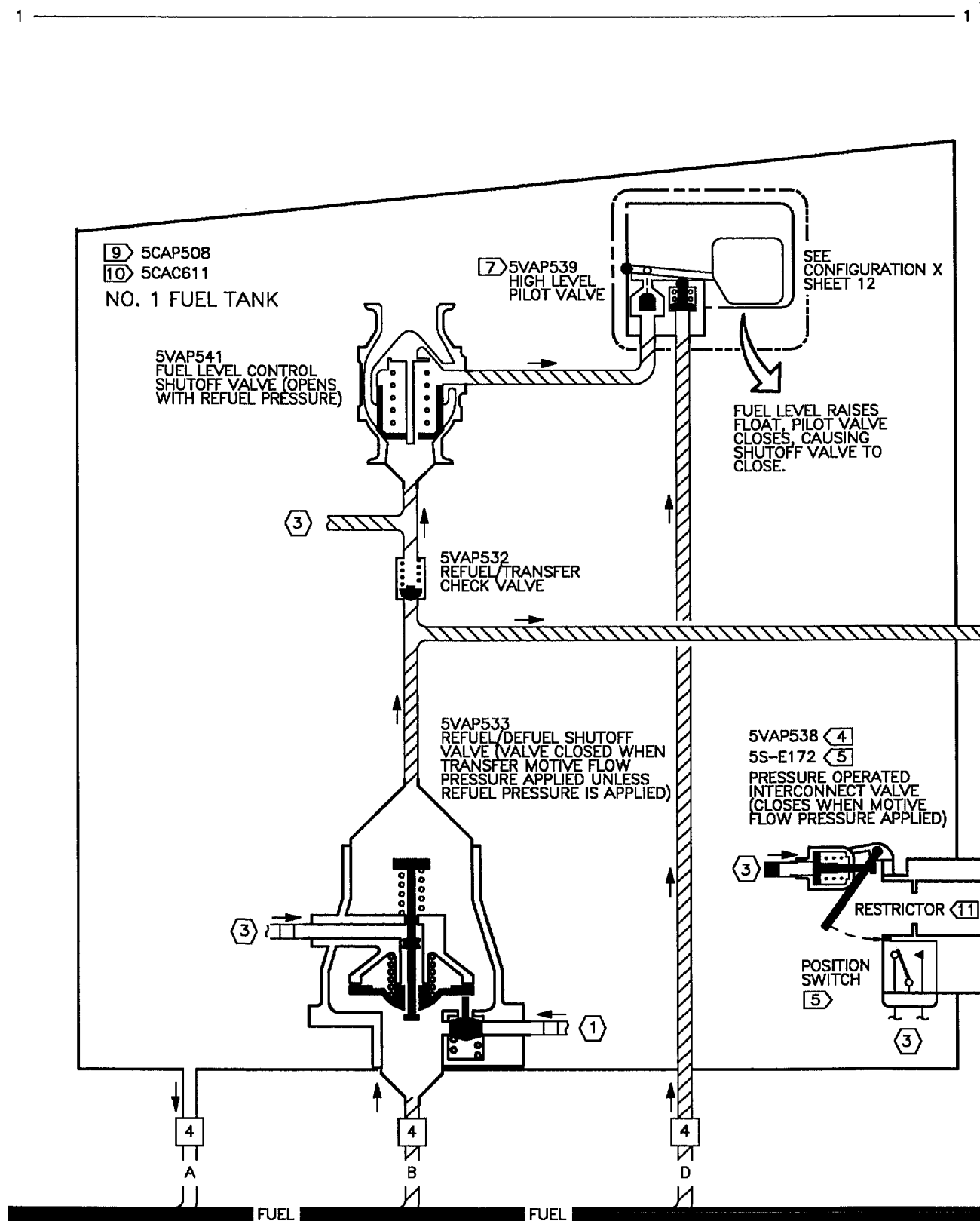
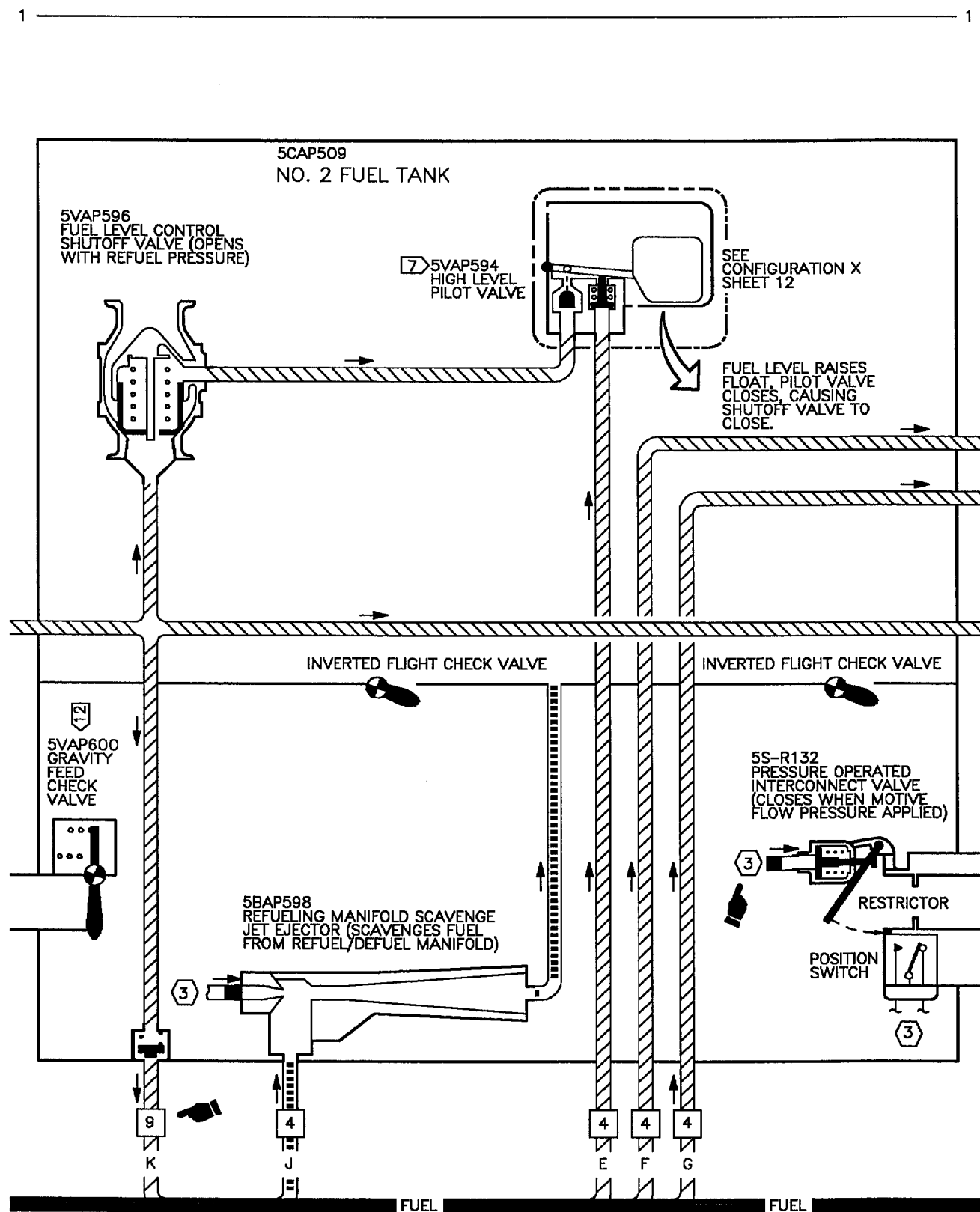


Figure 1. Refuel/Defuel System Simplified Schematic (Sheet 5)

18AC-460-10-(22-5)J-CAT1



18AC-460-10-(22-6)22-CAT1

Figure 1. Refuel/Defuel System Simplified Schematic (Sheet 6)

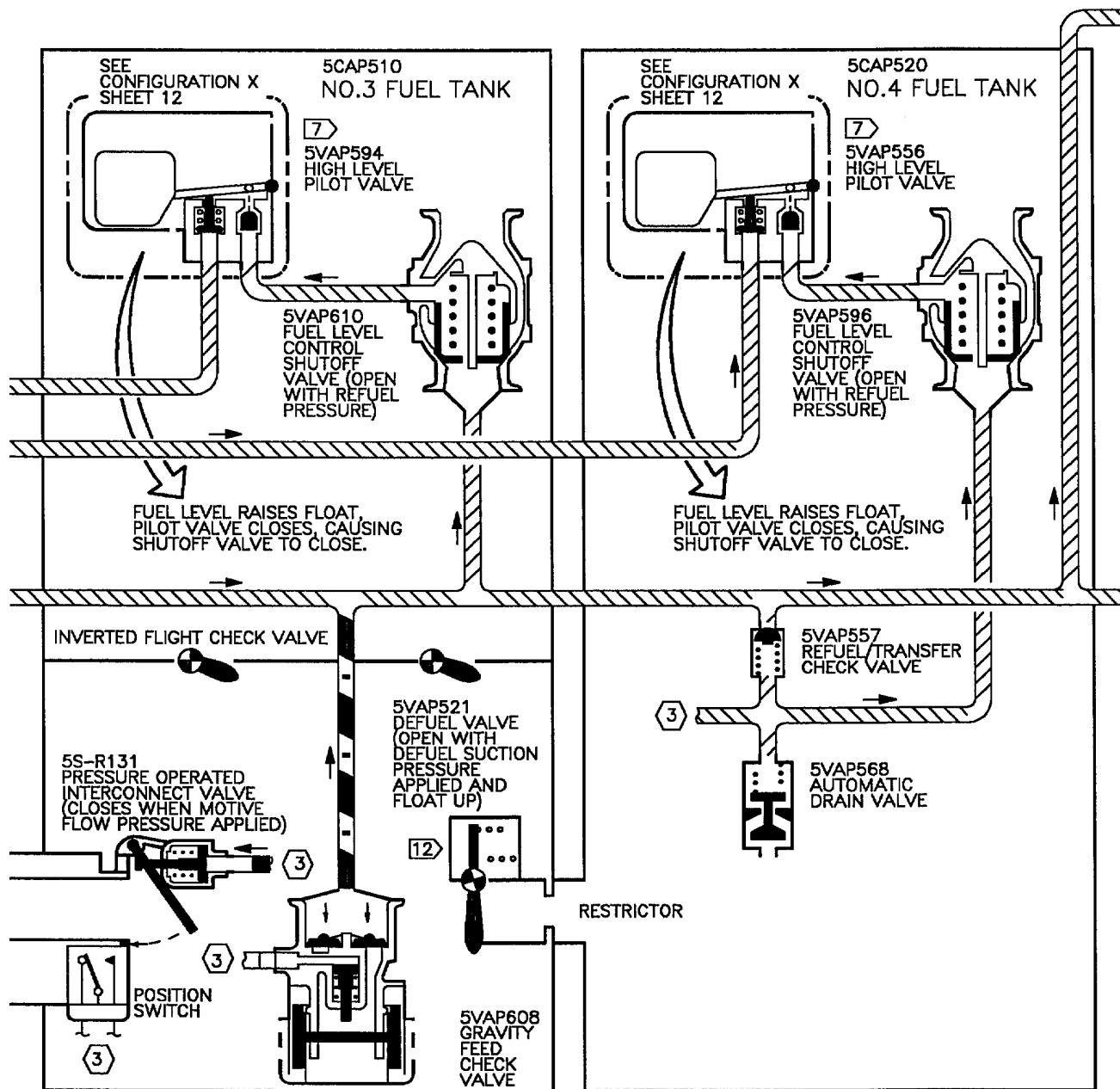
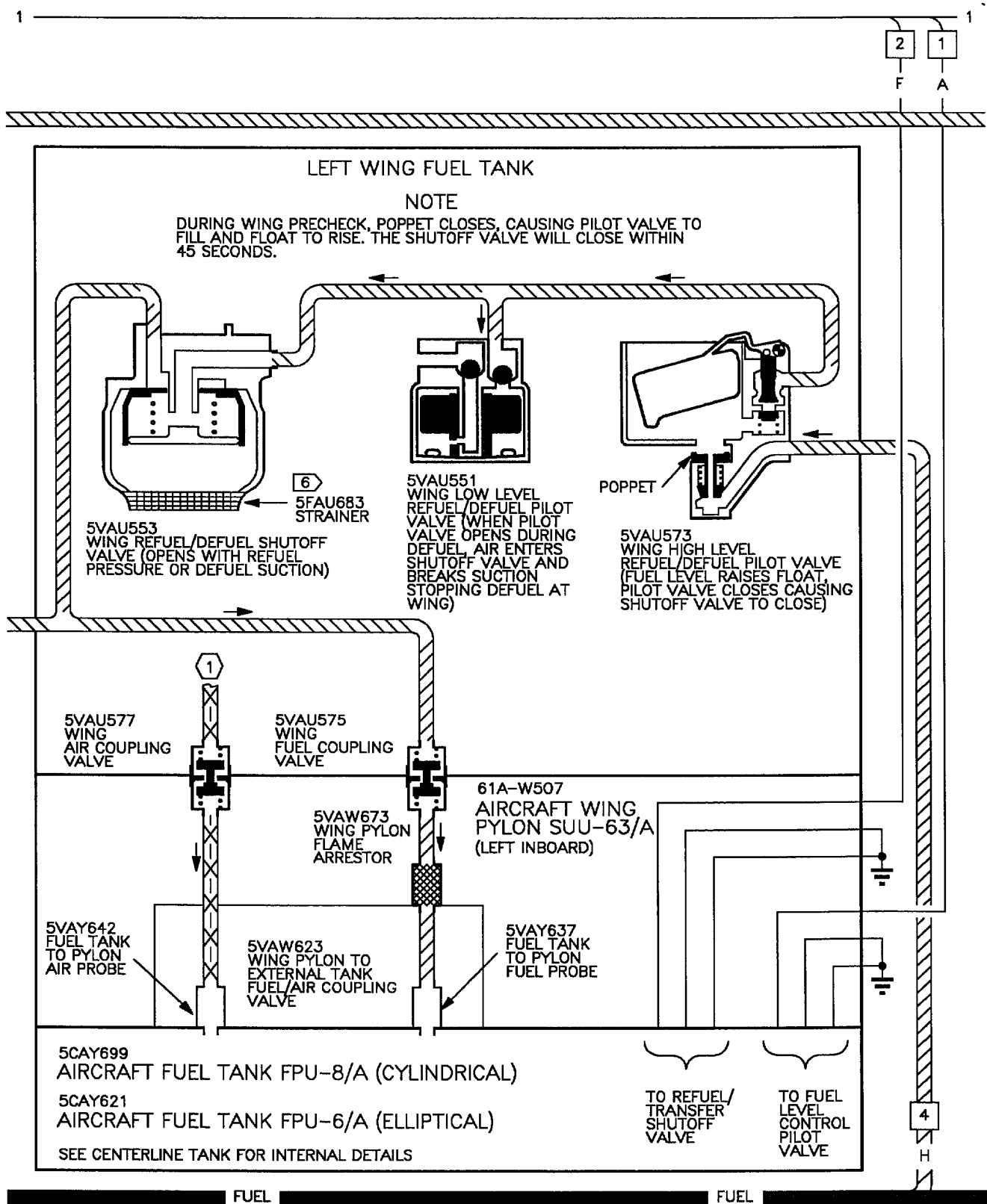


Figure 1. Refuel/Defuel System Simplified Schematic (Sheet 7)

18AC-460-10-(22-7)K-CAT1





18AC-460-10-(22-8)H-CAT1

Figure 1. Refuel/Defuel System Simplified Schematic (Sheet 8)

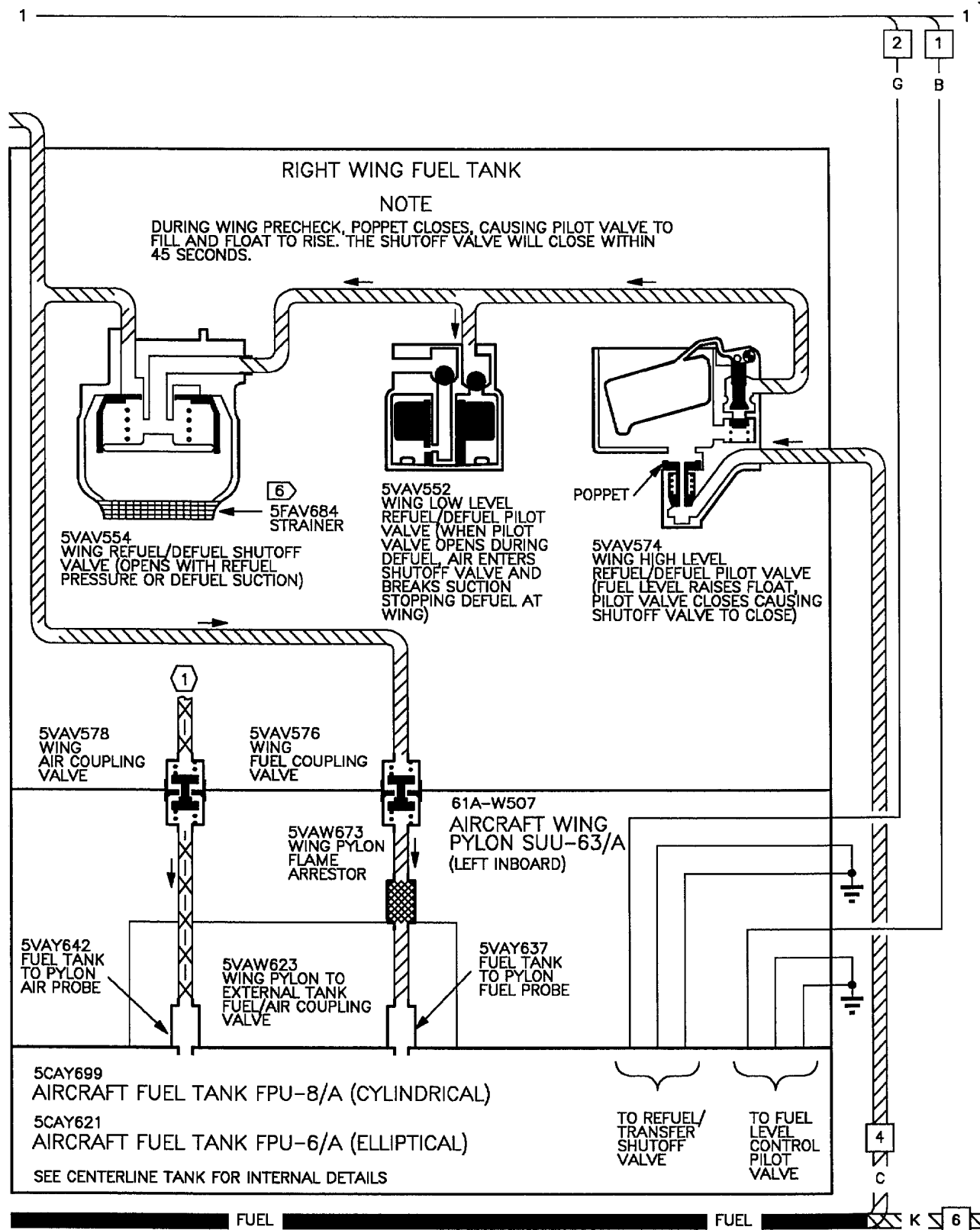
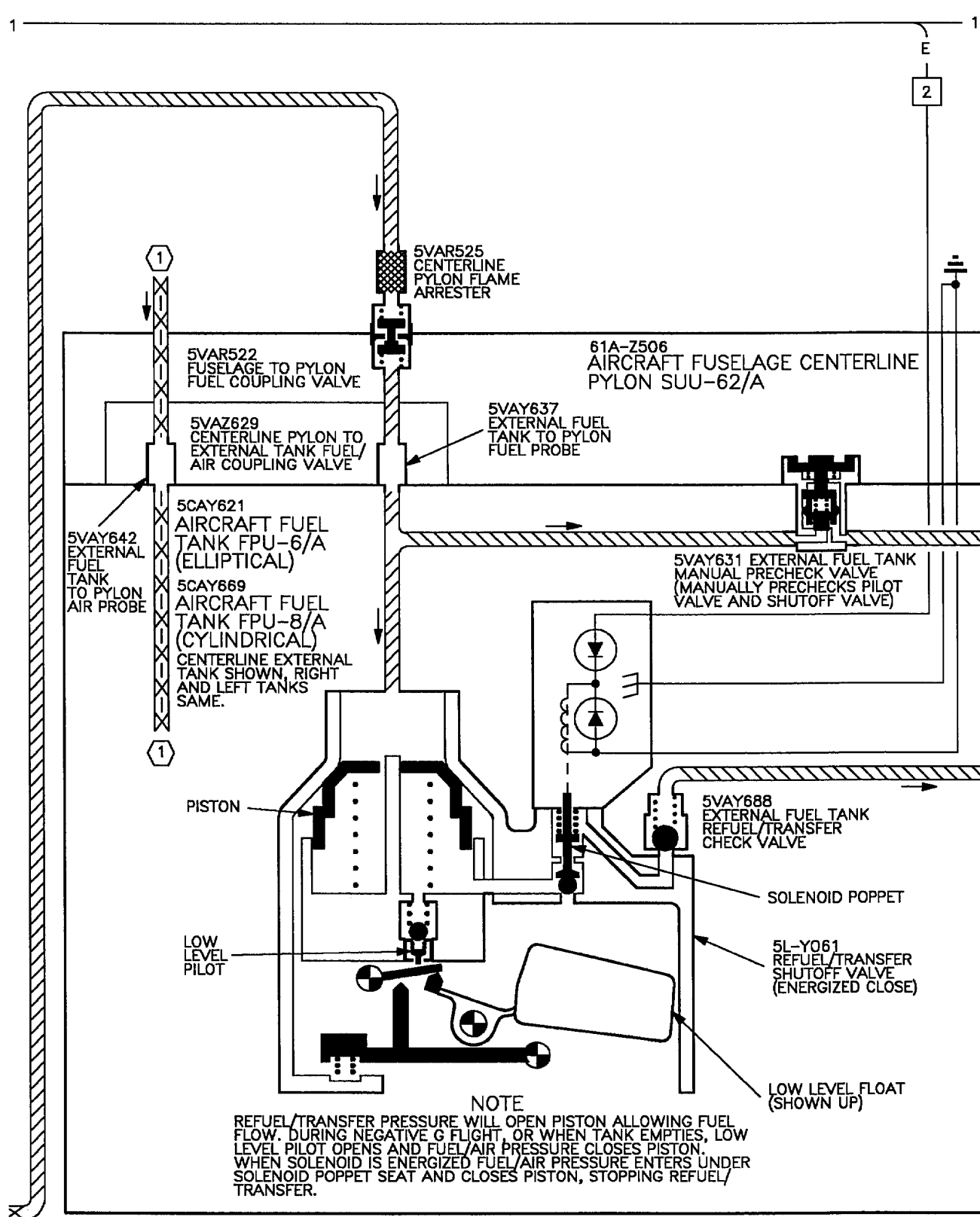


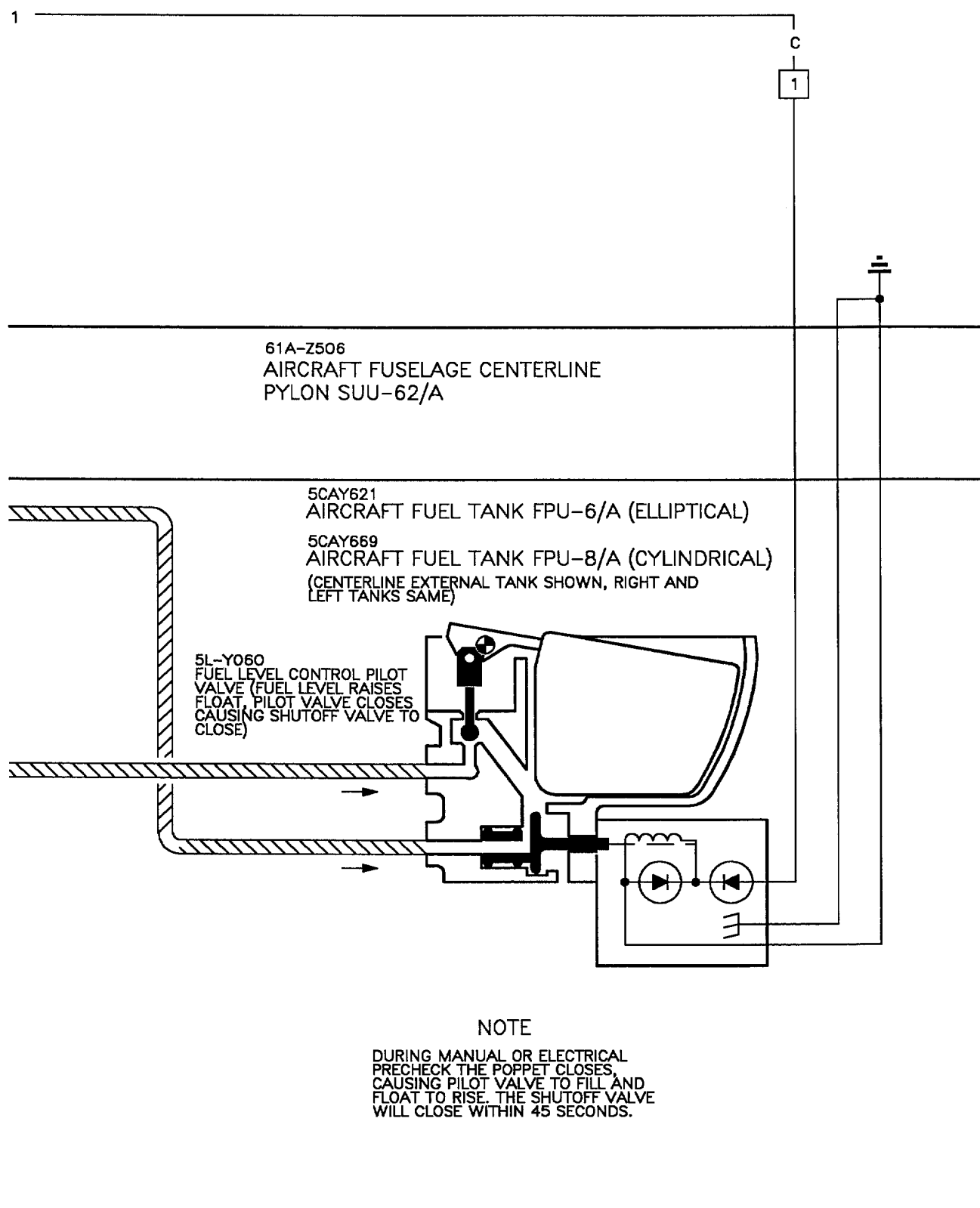
Figure 1. Refuel/Defuel System Simplified Schematic (Sheet 9)

18AC-460-10-(22-9)H-CATI



18AC-460-10-(22-10)J-CATI








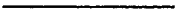
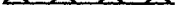
Figure 1. Refuel/Defuel System Simplified Schematic (Sheet 10)



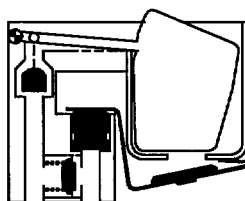
18AC-460-10-(22-11)J-CAT I

Figure 1. Refuel/Defuel System Simplified Schematic (Sheet 11)

## LEGEND

	FUEL		HIGHWAY FOR MULTIPLE FUEL PATTERNS
	TRANSFER MOTIVE FLOW		
	REFUEL		
	DEFUEL		
	MOTIVE FLOW		
	SCAVENGE		
	VENT		
	REGULATED AIR		

- 1 FUEL PRESSURIZATION AND VENT SYSTEM SIMPLIFIED SCHEMATIC, WPO20 00.
- 2 FUEL QUANTITY LOW LEVEL WARNING SYSTEM SIMPLIFIED SCHEMATIC, WPO23 02.
- 3 INTERNAL FUEL TRANSFER SYSTEM SIMPLIFIED SCHEMATIC, WPO14 00.
- 4 161353 THRU 161761 BEFORE F/A-18 AFC 39.
- 5 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39.
- 6 161735 AND UP
- 7 2800095 HIGH LEVEL PILOT VALVE
- 8 2800018 HIGH LEVEL PILOT VALVE
- 9 F/A-18A
- 10 F/A-18B
- 11 161353 THRU 161715
- 12 161716 AND UP; ALSO 161353 THRU 161715 AFTER F/A-18 AFC 53.
- 13 POWER DISTRIBUTION SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-420-100, WPO05 00.



8 HIGH LEVEL PILOT VALVE  
CONFIGURATION X

Figure 1. Refuel/Defuel System Simplified Schematic (Sheet 12)



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**ORGANIZATIONAL MAINTENANCE****PRINCIPLES OF OPERATION****DESCRIPTION AND OPERATION****INFLIGHT REFUELING SYSTEM**

---

**Reference Material**

Air Data Computer System .....	A1-F18AC-560-100
Description .....	WP003 00
Fuel System .....	A1-F18AC-460-100
Operation .....	WP003 01
Inflight Refueling System Component Locator and Simplified Schematic .....	WP008 01
Fuel Pressurization and Vent System Description and Operation .....	WP019 00
Hydraulic System .....	A1-F18AC-450-100
Principles of Operation .....	WP003 00
Landing Gear and Related Systems .....	A1-F18AC-130-100
Description and Operation .....	WP003 00
Multipurpose Display Group .....	A1-F18AC-745-100
Description .....	WP003 00
Maintenance Status Display and Recording System .....	A1-F18AC-580-100
Operation .....	WP005 00
Mission Computer System .....	A1-F18AC-741-100
Description - System and Component .....	WP003 00

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Operation .....	3
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System Operation .....	4

**Record of Applicable Technical Directives**

None

## 1. DESCRIPTION.

2. **SYSTEM DESCRIPTION.** The inflight refueling system allows refueling of the aircraft while in-flight. Inflight refueling and ground refueling systems are identical except for the cockpit PROBE control switch and the retractable inflight refueling probe.

3. The normally retracted inflight refueling probe is hydraulically extended using system 2A hydraulic pressure or emergency 2B hydraulic pressure.

4. The standard refueling nozzle is located on the forward end of the probe and is illuminated by a floodlight, when required.

5. **SYSTEM COMPONENTS.** System components shown in WP008 01 are described and listed below.

6. **Inflight Refueling Probe.** The IFR probe and linkage are hydraulically actuated to extend and retract. The probe barrel is designed to take a combination of drogue impact loads. The probe cavity and doors are liquid and vapor sealed (WP003 01).

7. **Inflight Refueling Probe Nozzle.** The inflight refueling probe nozzle is a normally closed, spring loaded, bullet shaped valve with three protruding engagement latches. When mated to the tanker aircraft drogue, the nozzle opens and allows refueling of the aircraft while inflight.

8. **Inflight Refueling Floodlight.** The IFR floodlight provides illumination of the nozzle for inflight refueling at night. The floodlight is illuminated when the IFR probe is extended and the exterior lights switch is on.

9. **Inflight Refueling Floodlight Transformer.** The inflight refueling floodlight transformer reduces aircraft voltage to the inflight refueling floodlight.

10. **Inflight Refueling Directional Control Valve.** The inflight refueling directional control valve is an electrically operated valve which directs hydraulic pressure to extend and retract the inflight refueling probe.

11. **Inflight Refueling Check Valve.** The IFR check valve is mounted in the inflight refueling line and prevents reverse fuel flow into the IFR probe if damage to the probe occurs.

## 12. Inflight Refueling Hydraulic Check

**Valve.** The IFR hydraulic check valve prevents return flow from other hydraulic systems from entering the inflight refueling probe system.

## 13. Inflight Refueling Probe Actuating Cylinder.

The IFR actuating cylinder is a double acting, hydraulic actuator that extends and retracts the inflight refueling probe. The actuating cylinder has an internal locking device which locks the cylinder in the retracted position (probe extended).

14. **Inflight Refueling Shuttle Valve.** The inflight refueling shuttle valve is a hydraulically operated valve which directs hydraulic system 2A pressure or emergency hydraulic system 2B pressure for probe extension.

## 15. Emergency Inflight Refueling Directional

**Control Valve.** The emergency inflight refueling directional control valve is an electrically operated valve which directs hydraulic pressure to extend the inflight refueling probe in emergency conditions.

16. **RELATED SYSTEMS.** Systems related to the inflight refueling probe system are listed below.

## 17. Maintenance Status Display and Recording System (MSDRS).

The maintenance status display and recording system receives inputs from the fuel system through the signal data converter and recorder. The MSDRS signal data recorder sends data to the mission computer system for processing. If the mission computer system detects a fuel system failure, it sends the applicable maintenance code to the MSDRS signal data recorder which sends it to the nose wheelwell Digital Display Indicator ID-2150/ASM-612 for storage and display (A1-F18AC-580-100, WP005 00).

18. **Mission Computer System.** The mission computer system receives fuel system data from the MSDRS. The mission computer system digital data computer no. 1 processes the data to determine when a fuel system failure or caution condition occurs. If a failure occurs, digital data computer no. 1 sends the applicable maintenance code to the MSDRS for storage and display. If a caution condition occurs, digital data computer no. 1 sends the caution message to the multipurpose display group for display (A1-F18AC-741-100, WP003 00).

19. **Multipurpose Display Group.** If the mission computer system detects a probe unlock caution, it sends the caution message to the multipurpose



display group. The left Digital Display Indicator IP-1317/A and on F/A-18B the rear left Digital Display Indicator IP-1318/A receive and display the PROBE UNLK caution message (A1-F18AC-745-100, WP003 00).

20. **Air Data Computer.** The air data computer sends through the mission computer system a PROBE UNLK caution if the probe does not retract within 25 seconds when pilot retracts probe (A1-F18AC-560-100, WP003 00).

21. **Hydraulic System.** The hydraulic system (A1-F18AC-450-100, WP003 00), system 2, has two priority valves. The forward valve supports circuit A pressure to the inflight refueling system. The inflight refueling directional control valve electrically controls the flow of system 2, circuit A and pressure to extend the inflight refueling probe. The retracted position of the inflight refueling probe is controlled by the directional control valve circuit A return that flows to the system 2 reservoir.

22. The emergency inflight refueling directional control valve bypasses the forward priority valve. System 2, circuit B pressure flows directly to the emergency inflight refueling directional control valve and extends the probe.

23. **Landing Gear And Related Systems.** The emergency landing gear (A1-F18AC-130-100, WP003 00) and emergency inflight refueling system are both hydraulically activated at the APU accumulator and start valve assembly.

24. **SYSTEM CONTROLS AND INDICATORS.** The inflight refueling system controls and indicators are listed below.

25. **PROBE Control Switch.** The PROBE control switch is a three position switch located on the cockpit FUEL system control panel and completes the electrical circuit to extend, retract, or emergency extend the inflight refueling probe.

26. **Left Digital Display Indicator IP-1317/A.** A PROBE UNLK caution display will appear on left Digital Display Indicator IP-1317/A in the cockpit and on F/A-18B left Digital Display Indicator IP-1318/A in the rear cockpit if the probe does not retract in 25 seconds.

27. **Inflight Refueling Probe Extend Limit Switch.** The inflight refueling probe extend limit switch is a plunger sensitive electro-mechanical switch attached to the inflight refueling probe actuating cylinder. The normally closed switch (probe retracted/actuating cylinder extended) sends 28vdc to the IFR directional control valve allowing probe to extend when PROBE control switch is set to EXTEND. When the probe actuating cylinder fully retracts, the extend limit switch opens and probe extension stops.

28. **Inflight Refueling Probe Retract Limit Switch.** The inflight refueling probe retract limit switch is a plunger sensitive electro-mechanical switch. As the inflight refueling probe retracts to the stowed position, the probe linkage actuates the limit switch and stops probe retraction.

## 29. OPERATION.

## 30. COMPONENT OPERATION.

31. **Inflight Refueling Probe and Door Drive Mechanism.** Operation of the inflight refueling probe and door drive mechanism is shown in WP003 01.

32. **Inflight Refueling Probe Nozzle.** When the nozzle is mated to the tanker aircraft drogue, the three protruding engagement latches on the nozzle are depressed. This releases the internal lock and allows contact between drogue and nozzle to open the nozzle and begin inflight refueling. When separated from the drogue, the nozzle closes and the three protruding engagement latches extend to lock the nozzle closed.

33. **Inflight Refueling Floodlight.** The inflight refueling floodlight receives 8.3vac from the inflight refueling floodlight transformer and is operational when the inflight refueling probe is extended and the exterior lights switch is on.

34. **Inflight Refueling Floodlight Transformer.** The inflight refueling floodlight transformer receives 115vac through the IFR control relay in the no. 3 relay panel assembly. The transformer steps down the voltage to 8.3vac before going to the inflight refueling floodlight.

35. **Inflight Refueling Directional Control Valve.** The inflight refueling directional control valve contains an extend solenoid, retract solenoid, plunger and piston. Normally the control valve is

deenergized and both solenoids closed, preventing hydraulic pressure flow (probe in stowed position). When energized, the control valve assumes one of the following positions:

Position 1. **EXTEND.** When energized by 28vdc, the extend solenoid opens and directs hydraulic pressure to shuttle the piston. As the piston shuttles, pressure and return ports are opened. Hydraulic pressure flows through the control valve to the retract side of the inflight refueling probe actuating cylinder (probe extends). Return pressure from the actuating cylinder flows through the control valve to the hydraulic system 2A return.

Position 2. **RETRACT.** When energized by 28vdc, the RETRACT solenoid opens and directs hydraulic pressure to shuttle the piston. As the piston shuttles, pressure and return ports are opened. Hydraulic pressure flows through the control valve to the extend side of the inflight refueling probe actuating cylinder (probe retracts). Return pressure from the actuating cylinder flows through the control valve to the hydraulic system 2A RETURN.

Position 3. **EMERGENCY EXTEND.** During emergency extend, hydraulic system 2B pressure closes a plunger within the inflight refueling directional control valve, preventing hydraulic system 2A pressure flow. Return pressure from the inflight refueling probe actuating cylinder is allowed to flow through the control valve to the hydraulic system 2A return.

**36. INFLIGHT REFUELING PROBE ACTUATING CYLINDER.** During probe extension, hydraulic system pressure is directed to one side of the actuating cylinder causing the cylinder to retract. When retracted (probe extended), the cylinder locks and hydraulic system pressure is removed. To retract the probe, hydraulic system pressure is directed to the opposite end of the actuating cylinder, which overcomes the internal locking device and extends the actuating cylinder (probe retracted). When the actuating cylinder is extended, the inflight refueling probe retract limit switch removes hydraulic system pressure.

**37. Emergency Inflight Refueling Directional Control Valve.** When energized by 28vdc, the emergency inflight refueling directional control valve directs emergency hydraulic system pressure to the inflight refueling probe actuating cylinder for probe extension.

**38. SYSTEM OPERATION.** A simplified schematic and component locator in WP008 01 shows the inflight refueling system.

**39. Extend.** When the PROBE control switch on the FUEL system control panel is set to EXTEND, the internal and external tanks air pressure regulators close and tanks are depressurized (WP019 00). The inflight refueling extend limit switch allows 28vdc to the inflight refueling directional control valve. The directional control valve then directs system 2A pressure to retract the probe actuating cylinder, extending the probe. Once the actuating cylinder is completely retracted (probe extended) the actuating cylinder opens the extend limit switch, deenergizing the directional control valve solenoid and stopping probe extension.

**40. Emergency Extension.** When the PROBE control switch is set to EMERGENCY EXTEND or EMERG EXTND, the emergency inflight refueling directional control valve is energized open allowing system 2B hydraulic pressure from the APU accumulator to flow through the IFR shuttle valve directly to the inflight refueling probe actuating cylinder.

**41. Refueling.** During tanker connection to the probe, the tanker drogue depresses the nozzle latches and forces the nozzle sleeve in. Fuel from the tanker passes through the probe nozzle into the probe barrel and refueling lines. A check valve in the inflight refueling line prevents reverse flow.

**42. Retraction.** Setting the PROBE control switch to RETRACT energizes the inflight refueling directional control valve. System 2A hydraulic pressure enters the actuating cylinder through the directional control valve. Once the actuating cylinder is completely extended (probe retracted), the probe linkage actuates the retract limit switch open deenergizing the directional control valve, stopping probe retraction.

**43.** If the probe does not retract in 25 seconds, the air data computer and mission computer systems will command the cockpit left digital display indicator to display the PROBE UNLK caution light.

**44. Inflight Refueling System Caution.** Cautions are displayed on left cockpit DDI IP-1317/A, IP-1318/A and light the MASTER CAUTION light. Inflight refueling system caution is explained below.

45. PROBE UNLK. Caution that indicates the inflight refueling probe is not secured when the PROBE control switch is set to RETRACT. A 25 second delay allows for probe transit time.



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**ORGANIZATIONAL MAINTENANCE**  
**PRINCIPLES OF OPERATION**  
**COMPONENT LOCATOR AND SIMPLIFIED SCHEMATIC**  
**INFLIGHT REFUELING SYSTEM**

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**Reference Material**

None

**Alphabetical Index**

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Inflight Refueling System Simplified Schematic, Figure 2 . . . . .	11

**Record of Applicable Technical Directives**

<b>Type/ Number</b>	<b>Date</b>	<b>Title and ECP No.</b>	<b>Date Incorp.</b>	<b>Remarks</b>
F/A-18 AFC 41	-	Installation of Equipment, Structure, Wiring and Attaching Hardware (ECP-MDA- F/A-18-00054C1)	1 Nov 86	-

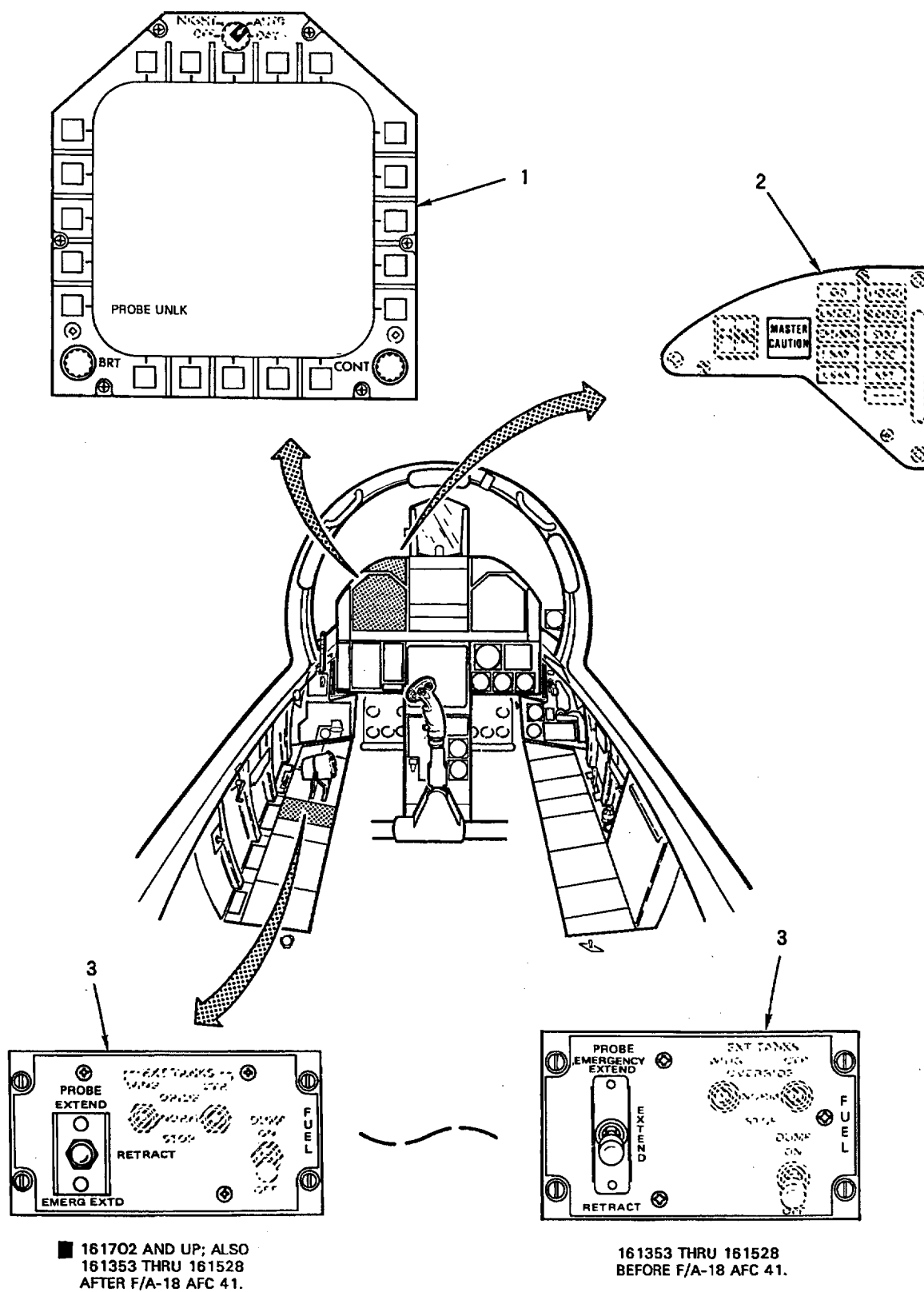
NOMENCLATURE	INDEX NO.	REF DES
ACCUMULATOR GAS CHARGING VALVE	13	2VAP531
AFT ISOLATION VALVE	26	10L-R012
AIR DATA COMPUTER CP-1334/A	11	70A-F001
APU ACCUMULATOR AND START VALVE ASSEMBLY	12	2L-P011
CONTROL CONVERTER C-10382/A	10	82A-F001
DIGITAL DATA COMPUTER NO. 1	7	83A-E001
EMERGENCY INFLIGHT REFUELING DIRECTIONAL CONTROL VALVE	4	5L-D009
EMERGENCY LANDING GEAR MANUAL CONTROL VALVE ASSEMBLY	15	10L-G017
FUEL SYSTEM CONTROL PANEL PROBE CONTROL SWITCH	3	5A-H027 5S-H005
INFLIGHT REFUELING CHECK VALVE	16	5VAB613
INFLIGHT REFUELING DIRECTIONAL CONTROL VALVE	23	5L-B007
INFLIGHT REFUELING FLOODLIGHT	20	5DSB008
INFLIGHT REFUELING FLOODLIGHT TRANSFORMER	25	5T-B012
INFLIGHT REFUELING HYDRAULIC CHECK VALVE	17	5VAC646
INFLIGHT REFUELING PROBE ACTUATING CYLINDER (PROBE EXTEND LIMIT SWITCH IS PART OF ACTUATING CYLINDER)	22	5HPB006
INFLIGHT REFUELING PROBE ASSEMBLY	19	5MPB547
INFLIGHT REFUELING PROBE NOZZLE	18	5VAB526
INFLIGHT REFUELING PROBE RETRACT LIMIT SWITCH	21	5S-B010
INFLIGHT REFUELING PROBE SHUTTLE VALVE	24	5VAB572
LEFT DIGITAL DISPLAY INDICATOR IP-1317/A	1	80A-H001
LH ADVISORY AND THREAT WARNING INDICATOR PANEL MASTER CAUTION LIGHT/SWITCH	2	52A-H073
NO. 3 RELAY PANEL ASSEMBLY IFR LIGHT CONTROL RELAY IFR SWITCH POSITION RELAY LMG WOW RELAY NO. 1	8	52A-E059 5K-E011 5K-E004 12K-E017
NO. 7 CIRCUIT BREAKER/RELAY PANEL ASSEMBLY EXTERIOR LIGHTS MASTER SWITCH RELAY	6	52A-C057 7K-C004
NO. 8 CIRCUIT BREAKER/RELAY PANEL ASSEMBLY EMER IFR CIRCUIT BREAKER (ZONE A3) HYD ISOL CIRCUIT BREAKER (ZONE B12) IFR LT CIRCUIT BREAKER (ZONE D8) IFR PROBE CIRCUIT BREAKER (ZONE B5)	5	52A-C159 5CBC001 10CBC016 5CBC003 5CBC002
SIGNAL DATA CONVERTER CV-3493/ASM-612	9	85A-N002
SIGNAL DATA RECORDER RO-508/ASM-612	14	85A-F001
NO. 4 CIRCUIT BREAKER PANEL ASSEMBLY IFR SWITCH POSITION RELAY	27	52A-D026 5K-D004

## LEGEND

① 161353 THRU 162909

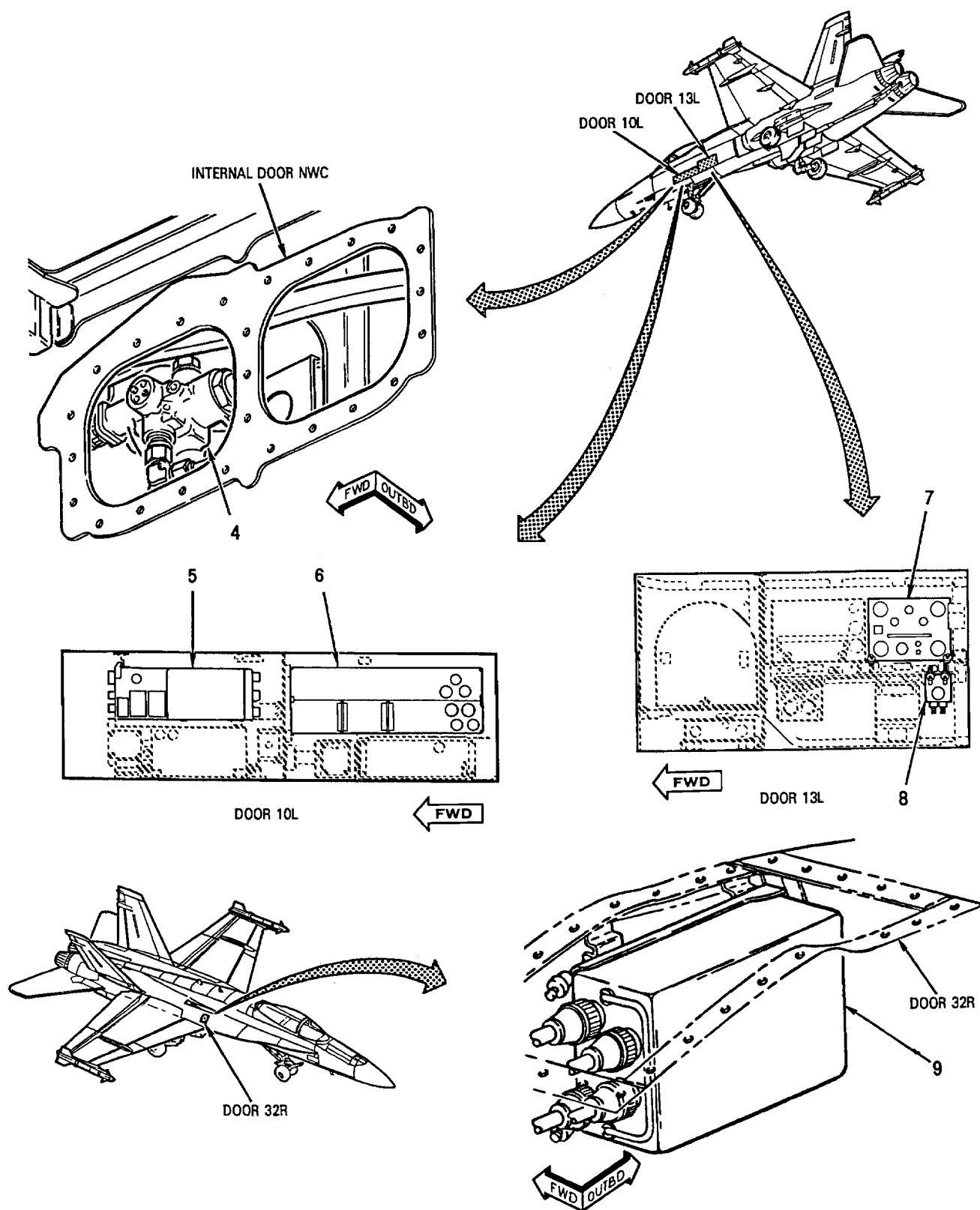
② 163092 AND UP

Figure 1. Inflight Refueling System Component Locator (Sheet 1)



18AC-460-10-(5-2)22

Figure 1. Inflight Refueling System Component Locator (Sheet 2)



18AC-460-10-(5-3)D

Figure 1. Inflight Refueling System Component Locator (Sheet 3)





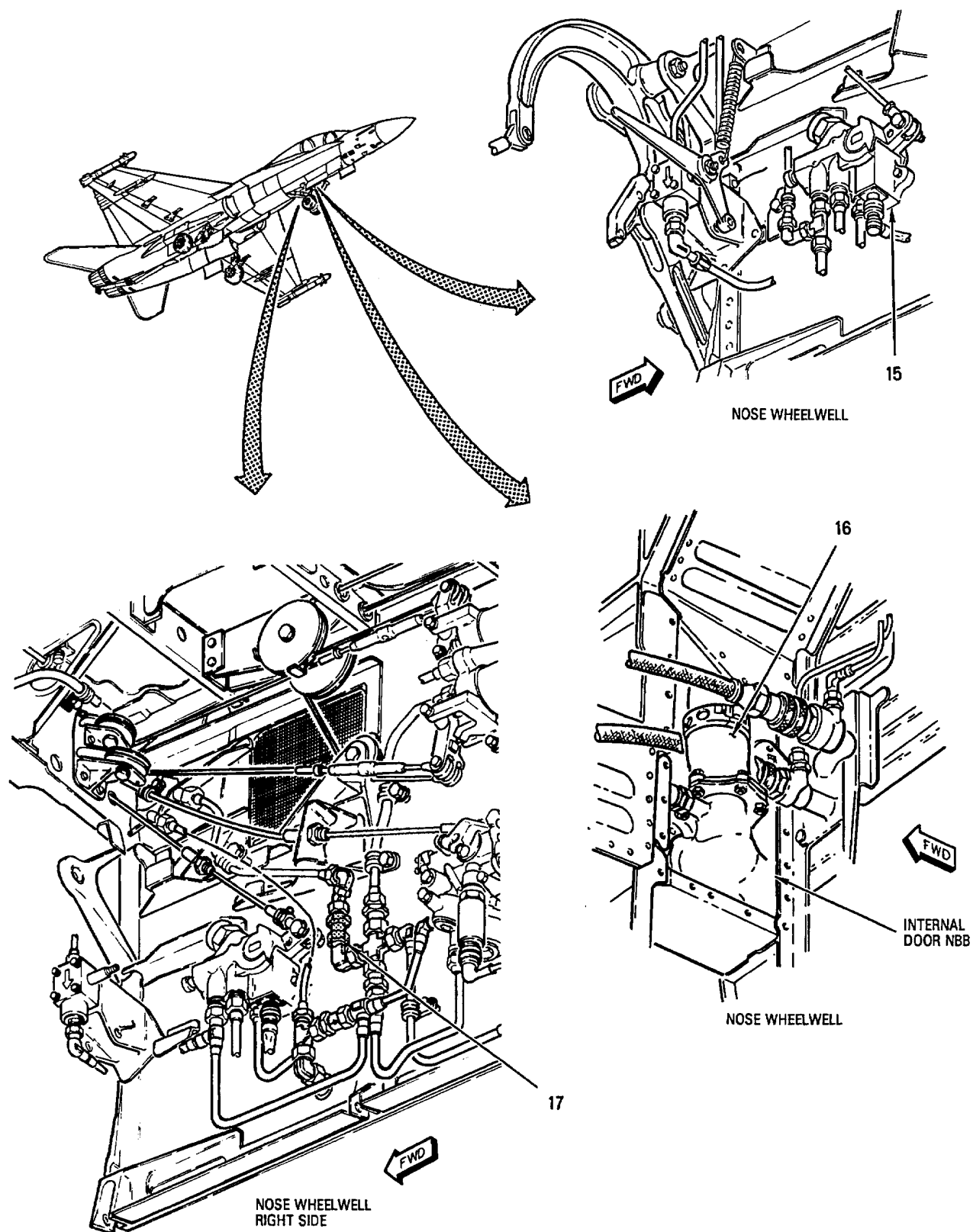
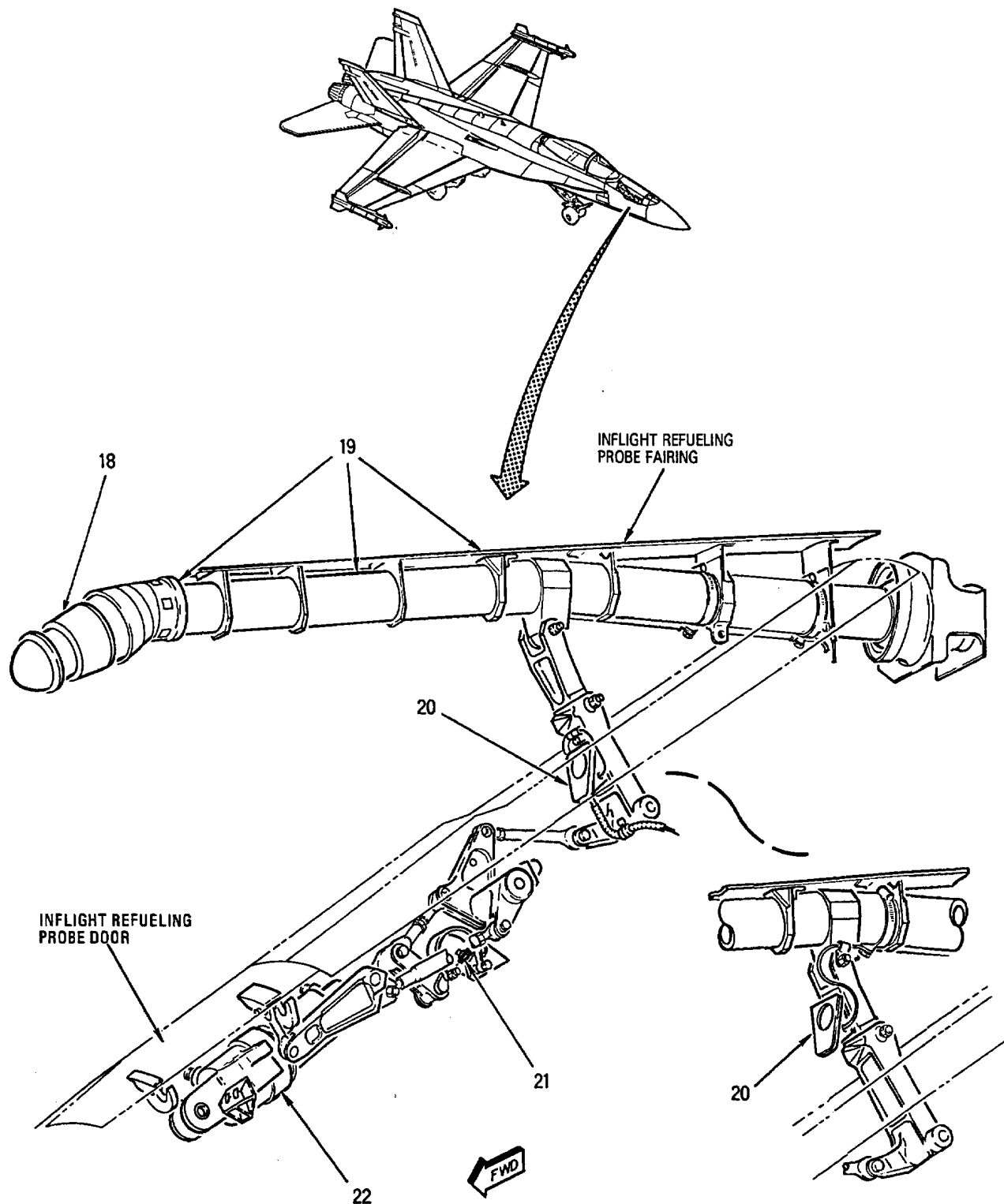


Figure 1. Inflight Refueling System Component Locator (Sheet 5)



161353 THRU 161528

18AC-460-10-(5-6)G

Figure 1. Inflight Refueling System Component Locator (Sheet 6)

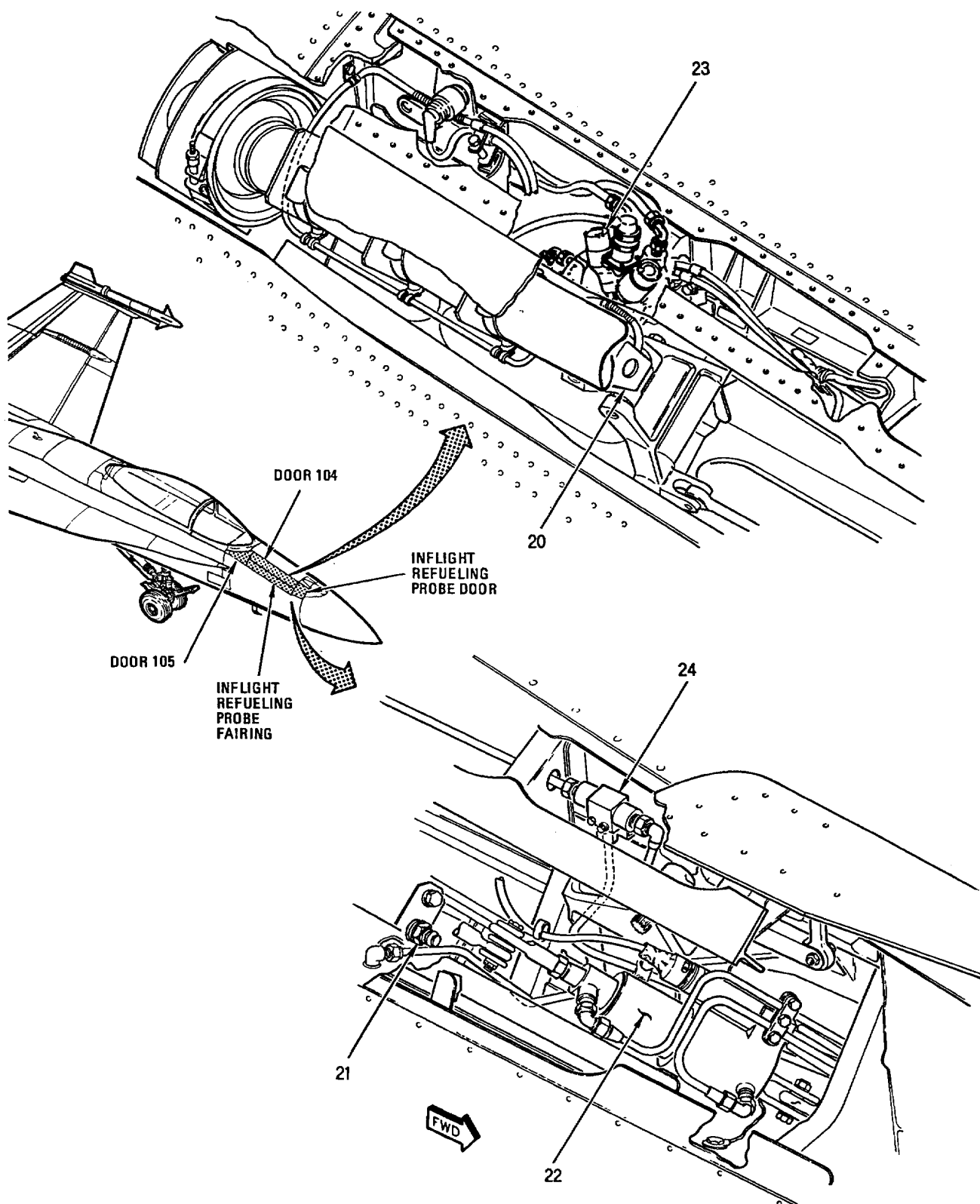


Figure 1. Inflight Refueling System Component Locator (Sheet 7)

18AC-460-10-(5-7)F

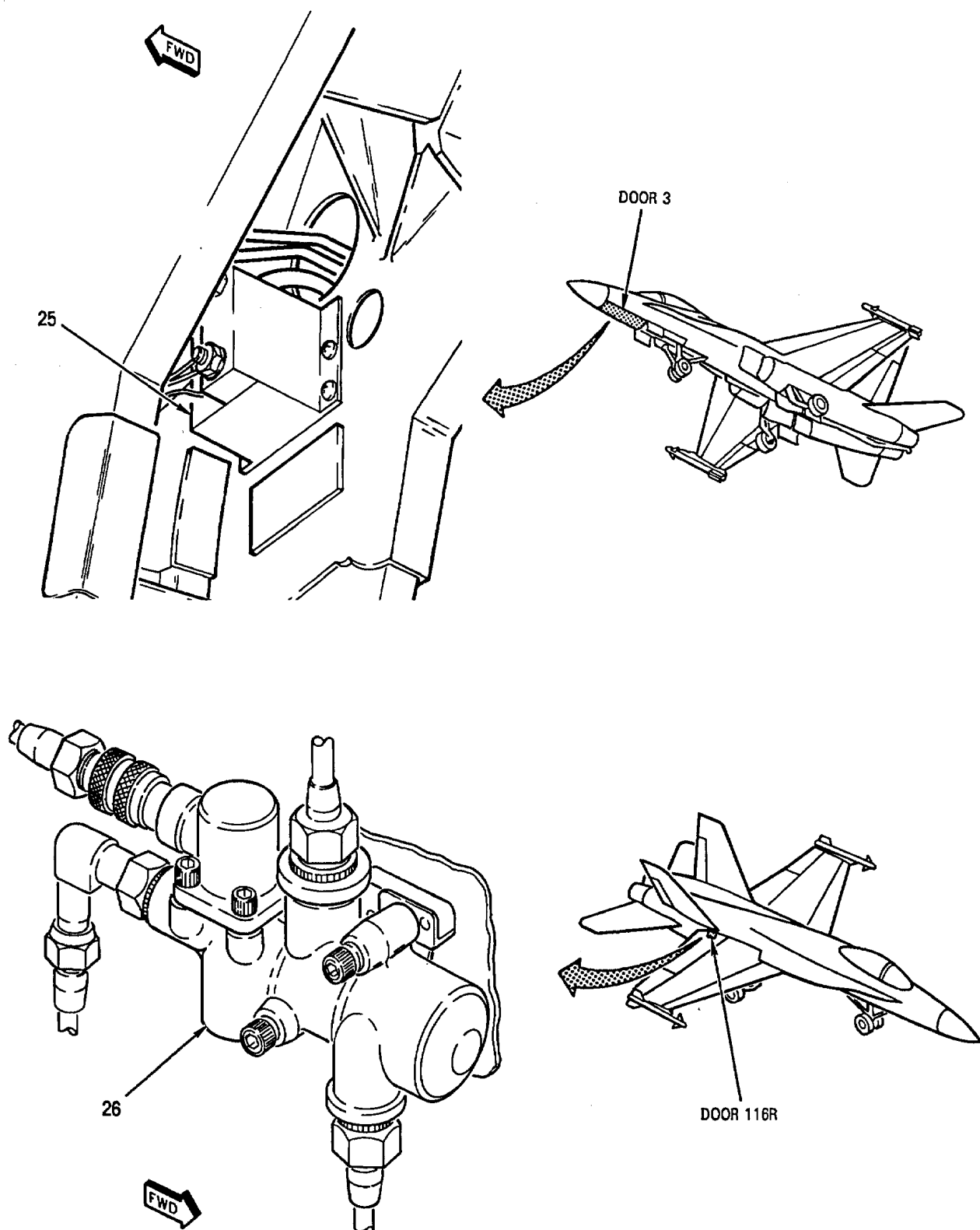


Figure 1. Inflight Refueling System Component Locator (Sheet 8)

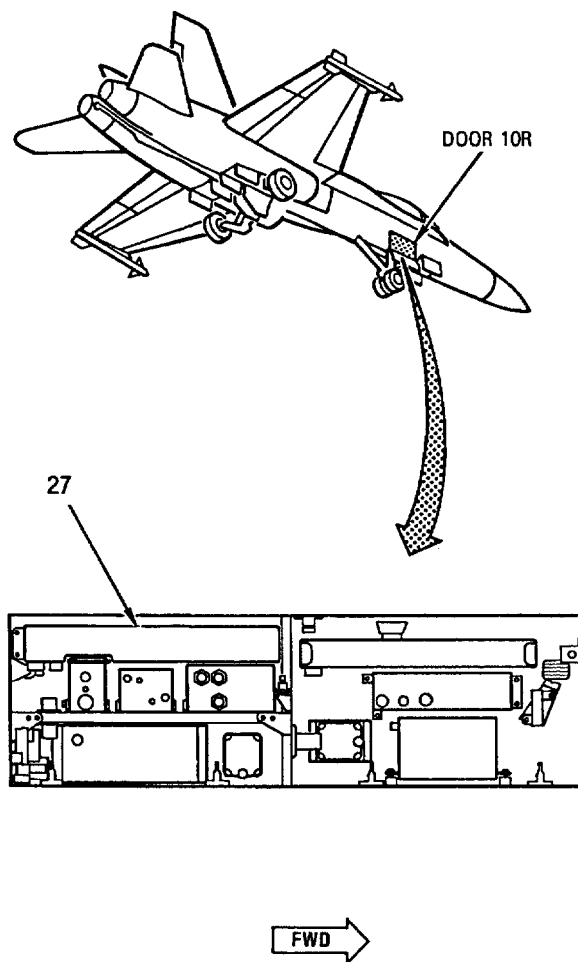
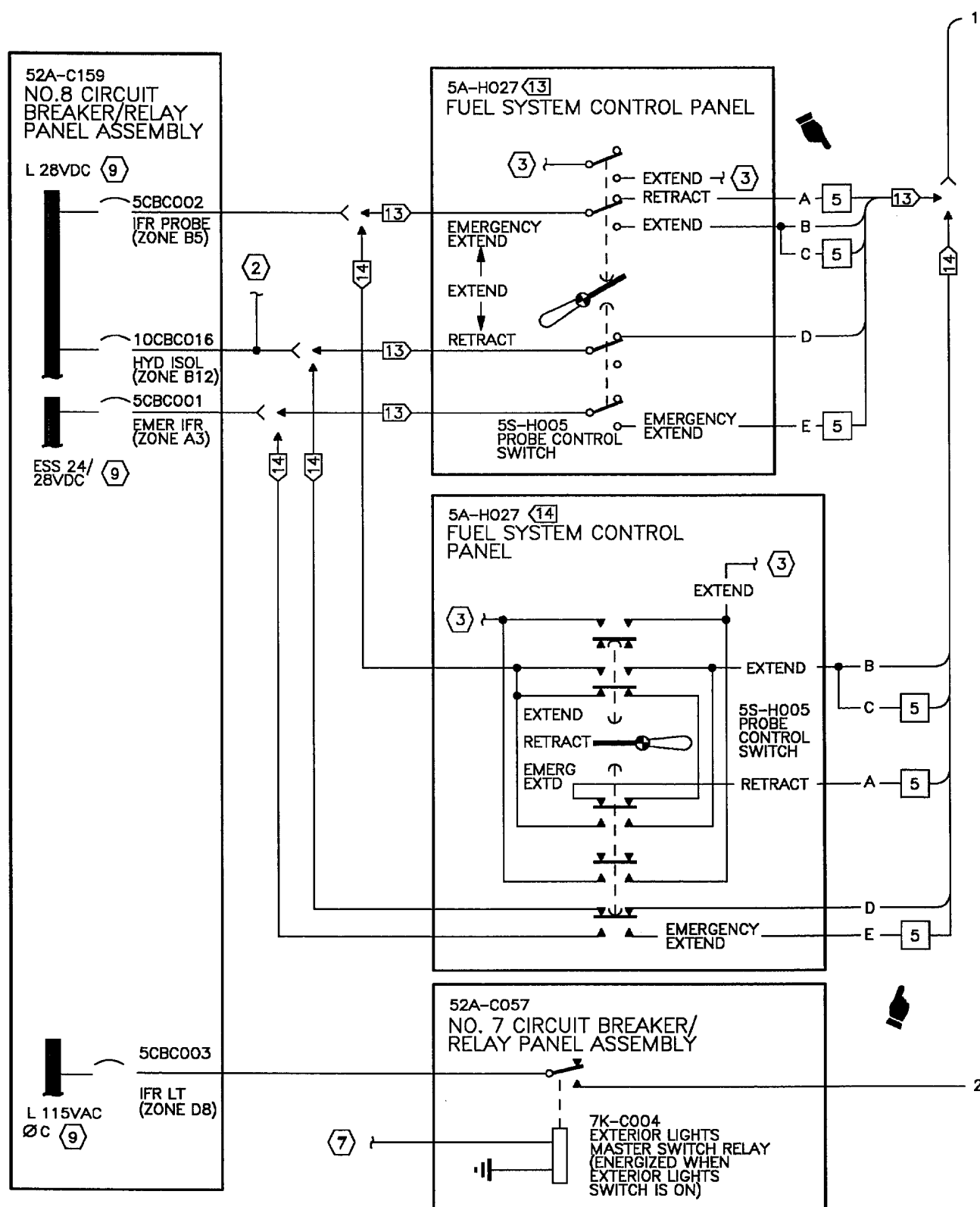
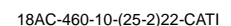


Figure 1. Inflight Refueling System Component Locator (Sheet 9)



18AC-460-10-(25-1)22-CATI

Figure 2. Inflight Refueling System Simplified Schematic (Sheet 1)



### Figure 2. Inflight Refueling System Simplified Schematic (Sheet 2)



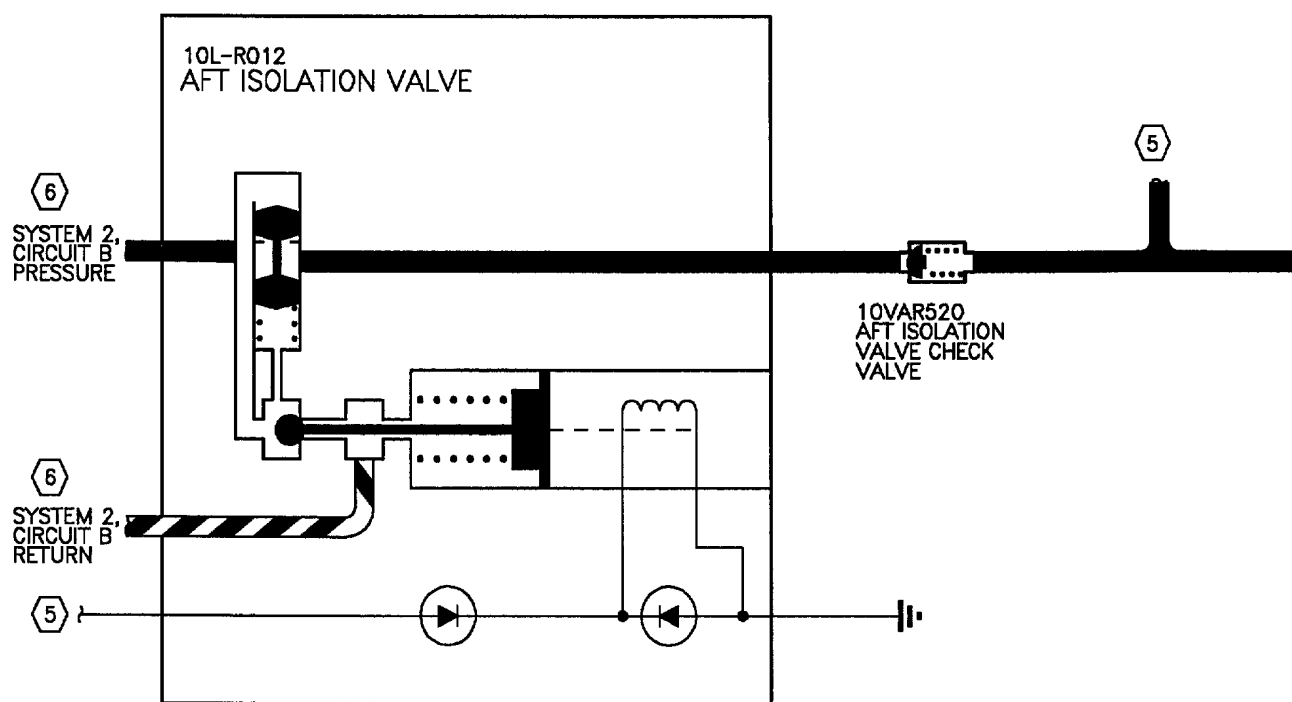
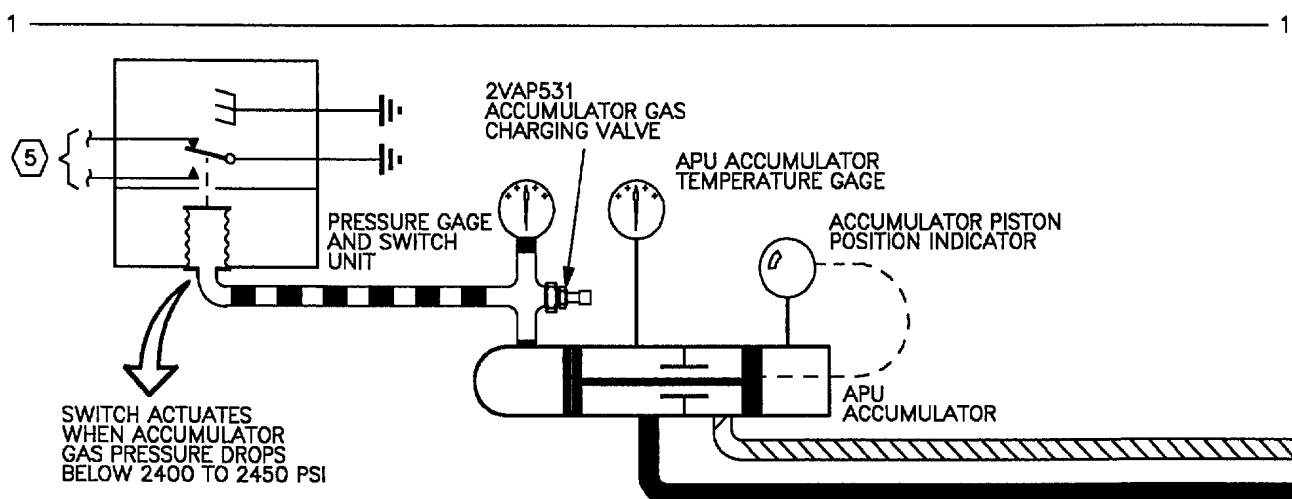
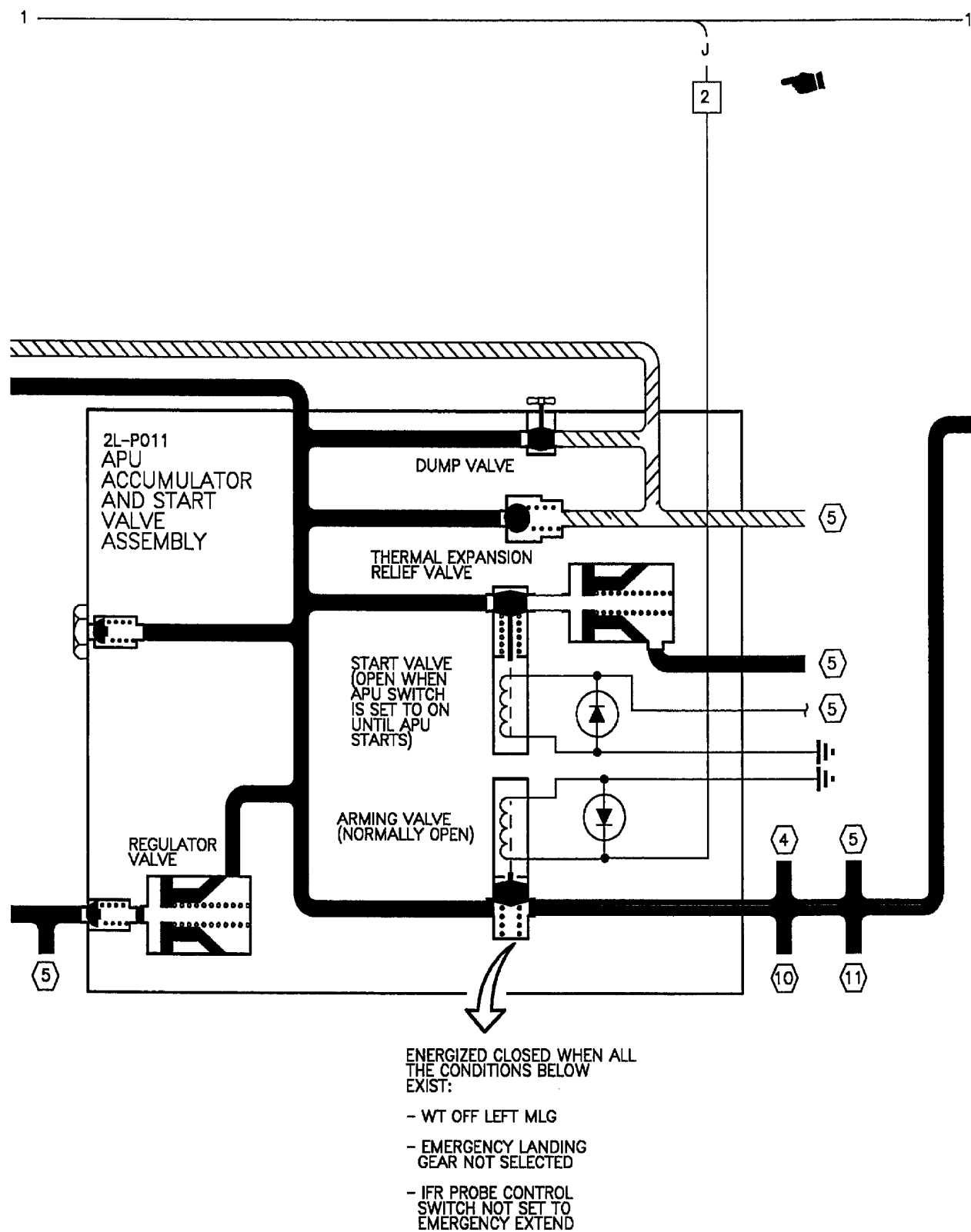


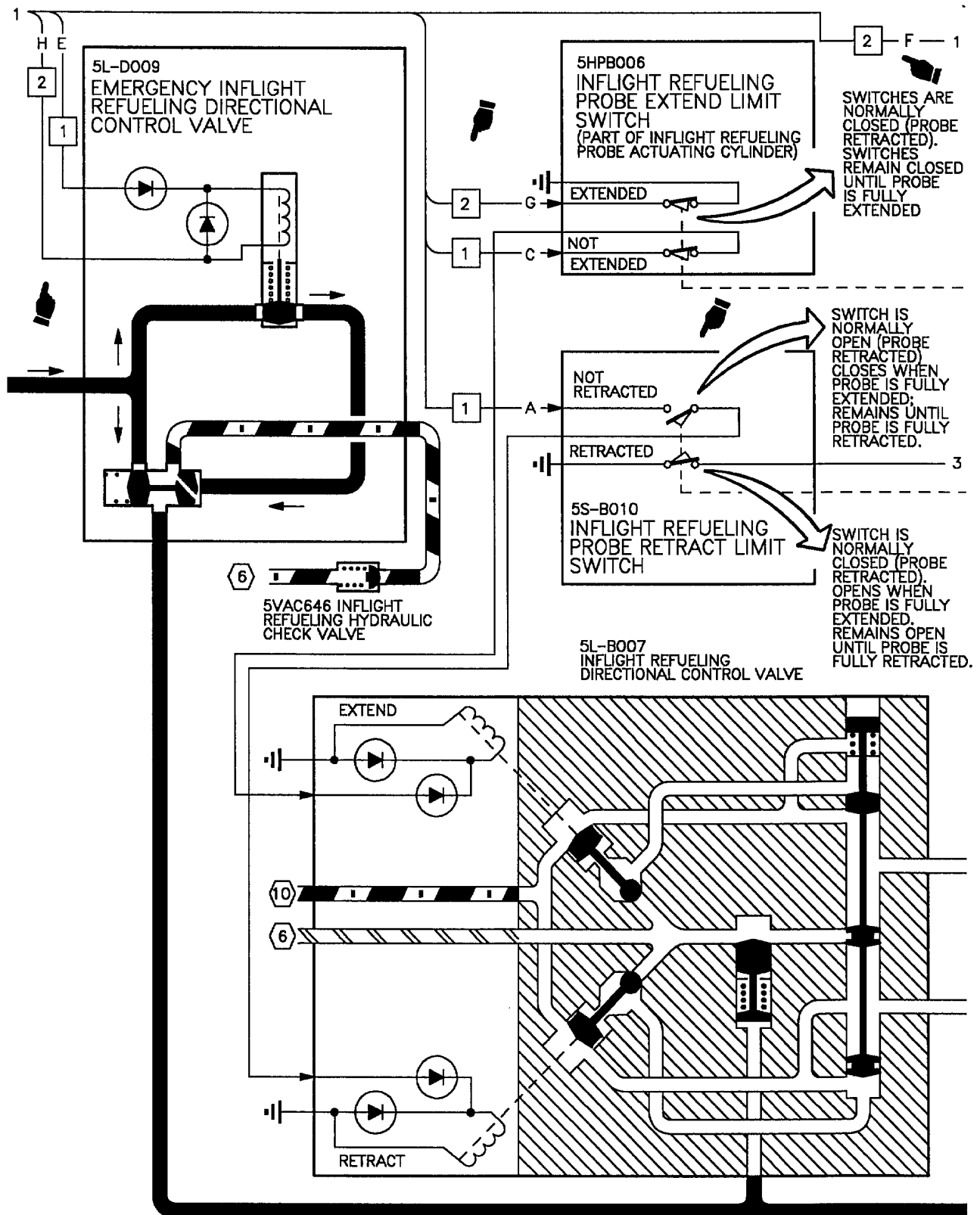
Figure 2. Inflight Refueling System Simplified Schematic (Sheet 3)

18AC-460-10-(25-3)H-CATI



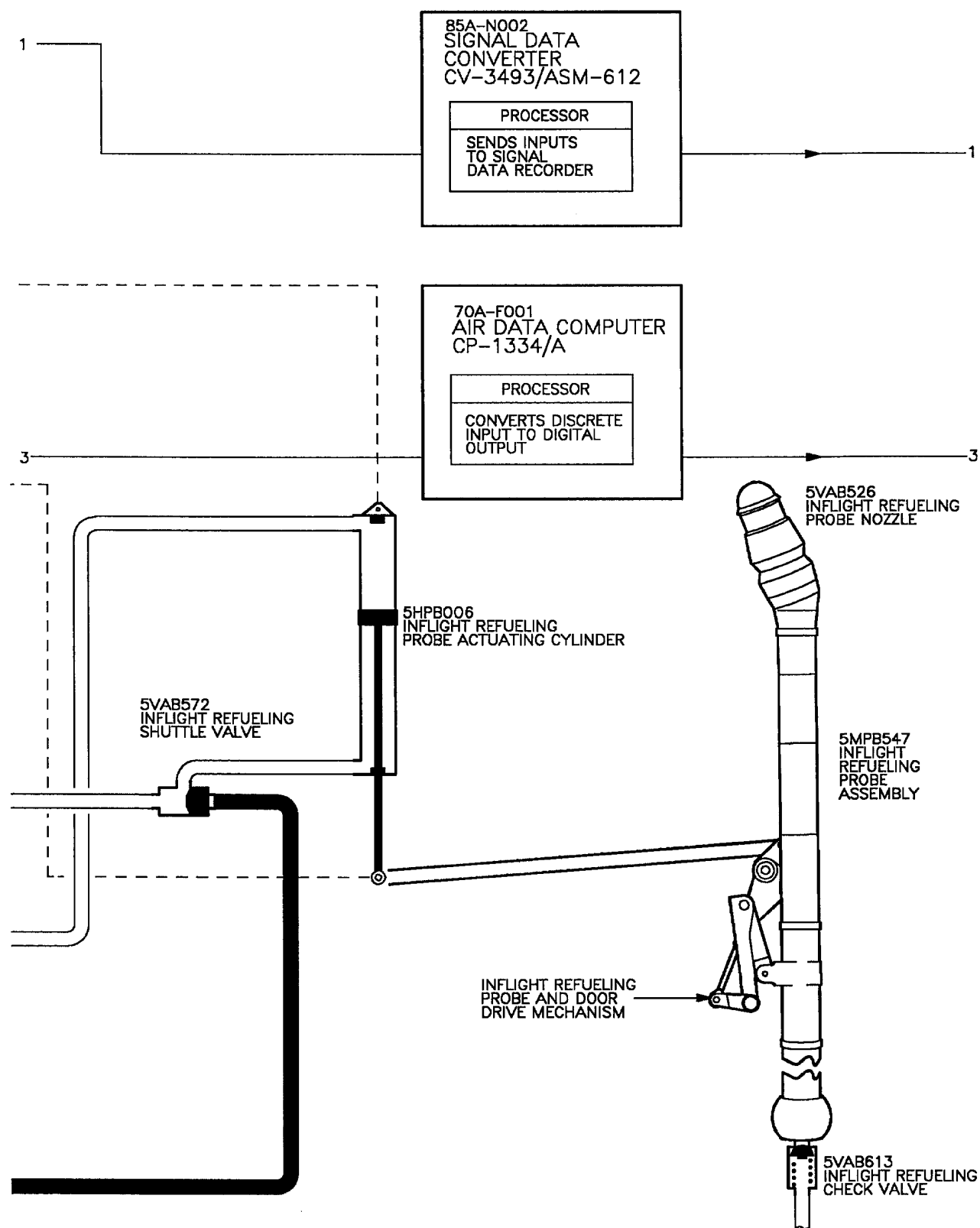
18AC-460-10-(25-4)22-CAT1

Figure 2. Inflight Refueling System Simplified Schematic (Sheet 4)



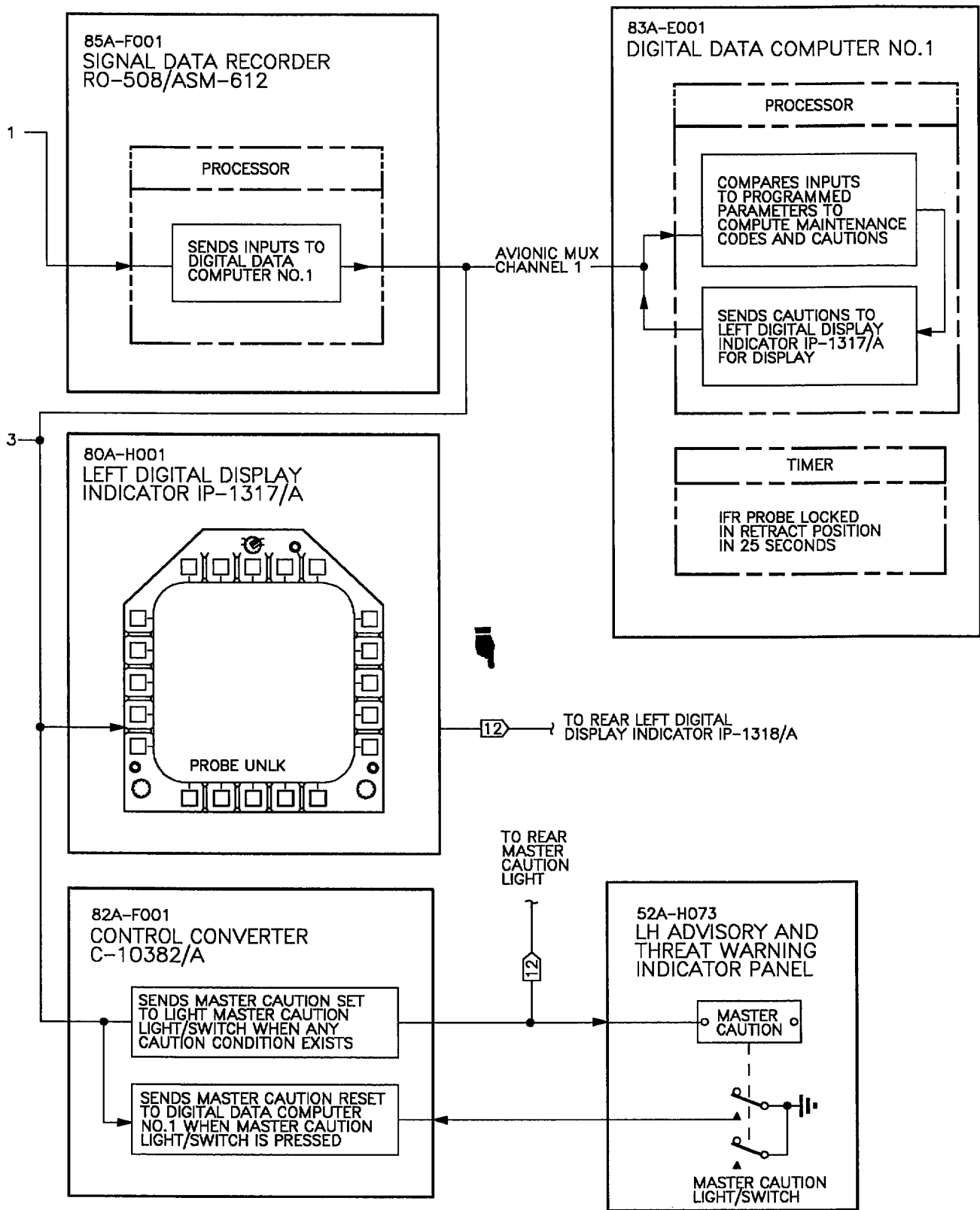
18AC-460-10-(25-5)22-CAT1

Figure 2. Inflight Refueling System Simplified Schematic (Sheet 5)



18AC-460-10-(25-6)22-CAT1





Figure 2. Inflight Refueling System Simplified Schematic (Sheet 6)




18AC-460-10-(25-7)22-CAT1

Figure 2. Inflight Refueling System Simplified Schematic (Sheet 7)

## LEGEND

	SYSTEM 2, CIRCUIT B RETURN
	SYSTEM 2, CIRCUIT B PRESSURE (EMERG)
	SYSTEM 2, CIRCUIT A RETURN
	SYSTEM 2, CIRCUIT A PRESSURE

## 1. NONSTANDARD SYMBOLS

 STRUCTURAL PIVOT

 NON-STRUCTURAL PIVOT

 TELELIGHT
















-  LANDING GEAR CONTROLLED RELAYS SIMPLIFIED SCHEMATIC, A1-F18AC-130-100, WP006 00.
-  FUEL PRESSURIZATION AND VENT SYSTEM SIMPLIFIED SCHEMATIC, WP020 00
-  WHEEL BRAKE AND ANTISKID SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-130-100, WP008 02.
-  APU START SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-240-100, WP004 00.
-  HYDRAULIC SYSTEM 2 SIMPLIFIED SCHEMATIC, A1-F18AC-450-100, WP003 00
-  POSITION LIGHTS SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-440-100, WP003 00.
-  LANDING GEAR CONTROL SIMPLIFIED SCHEMATIC, A1-F18AC-130-100 WP004 00.
-  POWER DISTRIBUTION SIMPLIFIED SCHEMATIC, A1-F18AC-420-100, WP005 00.
-  GUN SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-750-100, WP006 00
-  NOSEWHEEL STEERING SIMPLIFIED SCHEMATIC, A1-F18AC-570-100, WP028 00.
-  F/A-18B.
-  161353 THRU 161528 BEFORE F/A-18 AFC 41.
-  161702 AND UP; ALSO 161353 THRU 161528 AFTER F/A-18 AFC 41.
-  161353 THRU 162909.
-  163092 AND UP.

Figure 2. Inflight Refueling System Simplified Schematic (Sheet 8)

## ORGANIZATIONAL MAINTENANCE

## PRINCIPLES OF OPERATION

## DESCRIPTION AND OPERATION

## EXTERNAL FUEL SYSTEM

## Reference Material

Fuel System .....	A1-F18AC-460-100
Operation .....	WP003 01
Refuel/Defuel System Description and Operation .....	WP005 00
Inflight Refueling System Description and Operation .....	WP008 00
External Fuel System Component Locator .....	WP010 00
External Fuel System Simplified Schematic .....	WP011 00
Fuel Dump System Description and Operation .....	WP017 00
Fuel Quantity Gaging System Description and Operation .....	WP021 00
Fuel Pressurization and Vent System Description and Operation .....	WP019 00
Fuel Quantity Low Level Warning System Description and Operations .....	WP023 00
Internal Fuel Transfer System Description .....	WP012 00
Weapon Control Systems .....	A1-F18AC-740-100
External Fuel Tank .....	WP035 00
Maintenance Status Display and Recording System .....	A1-F18AC-580-100
Operation .....	WP005 00
Mission Computer System .....	A1-F18AC-741-100
Description .....	WP003 00
Multipurpose Display Group .....	A1-F18AC-745-100
Description .....	WP003 00

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Component Operation .....	4
System Operation .....	5

## Record of Applicable Technical Directives

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 AFC 39	-	No. 1 Fuel Tank Interconnect Valve Replacement and Fuel Sequencing Modification (ECP MDA-F/A-18-00072C1)	1 Nov 86	-

1. **DESCRIPTION.**

2. **SYSTEM DESCRIPTION.** The external fuel system consist of one, two, or three external tanks mounted on the inboard wing pylons and/or centerline pylon. Each tank is attached by two suspension lugs and a jettison pivot and can be jettisoned selectively or all at once.

3. Each tank provides storage for 2140 or 2240 pounds of fuel and contains components which will operate without electrical power for fuel transfer, refueling, precheck and pressurization.

4. Fuel and air probes in each external tank provides interface with the pylons for refuel, transfer, and pressurization. Each tank is electrically connected to the pylon to provide fuel quantity gaging (WP021 00), stop refuel/transfer, and electrical precheck.

5. **Elliptical Aircraft Fuel Tank FPU-6/A.** The elliptical external fuel tank is aluminum with fluid tight welded seams covered with a survivable shell. The tank has a capacity of 315 gallons (2140 pounds) and contains valves for controlling refuel, transfer, and pressurization. When refueling, each tank can be manually or electrically prechecked. Transfer and refueling can also be stopped electrically. The electrically operated valves are interfaced so that they are installed as an assembly.

6. Pressure operated valves control air pressure for fuel transfer and prevent damage resulting from overpressurization. The tank contains a fuel quantity transmitter for reporting fuel quantities to the fuel quantity gaging system (WP021 00).

7. **Cylindrical Aircraft Fuel Tank FPU-8/A.** The cylindrical external tank is aluminum with fluid tight welded seams covered with a survivable shell. The tank has a capacity of 330 gallons (2240 pounds) and contains valves for controlling refuel, transfer and pressurization of the tank. When refueling, each tank can

be manually or electrically prechecked. Transfer and refueling can also be stopped electrically.

8. Pressure operated valves control air pressure for tank transfer and prevent damage due to overpressurization. The tank contains a fuel quantity transmitter for reporting fuel quantities to the fuel quantity gaging system (WP021 00).

9. Tank electrical components are separately spliced in the drywell area and can be replaced individually. A fuel filler cap provides a method for alternate refueling.

10. **Survival Shell.** The survivable shell is a 5/16-inch thick covering of wound epoxy/fiberglass. Embedded in the epoxy/fiberglass rovings is a layer of woven carbon fabric over a polyurethane foam filled paper honeycomb core. Woven into fiberglass are strands of high strength graphite. The shell is designed to prevent or reduce rupture of the aluminum tank due to fire, fragment impact or penetration and internal explosion.

11. **COMPONENT DESCRIPTION.** External fuel system components shown in WP010 00 are described in the paragraphs below. For related component descriptions listed below, refer to applicable WP.

a. External tanks air pressure regulator (WP019 00).

b. Ground air pressurization filter (WP019 00).

c. Ground air pressurization connector (WP019 00).

d. Bleed air check valve (WP019 00).

e. External tanks air pressure regulator (WP019 00).

f. External fuel system air pressure switch (5psi) (WP019 00).



g. External fuel system air pressure switch (34psi) (WP019 00).

h. External tanks air pressure transducer (WP019 00).

i. External fuel system ground test connector (WP019 00).

j. External fuel system pressurization bleed orifice (WP019 00).

k. External fuel tank fuel quantity transmitter (WP021 00).

**12. External Tank Pressurization and Vent Valve.** The pressurization and vent valve senses and relieves positive or negative pressure in the external tank, controls pressurization for external tank fuel transfer, and vents the external tank during refueling operations.

**13. External Fuel Tank Pressure Relief Valve.** The pressure relief valve is a check valve which prevents damage to the external fuel tank due to overpressurization. As air pressure increases to 35 to 39psi, the relief valve opens, allowing pressure to bleed overboard.

**14. Coupling Valves.** Coupling valves provide a quick disconnect between the pylons, aircraft and external tank. The coupling valves in the external fuel system are listed below:

a. Wing fuel coupling valve.

b. Wing air coupling valve.

c. Fuselage to pylon fuel coupling valve.

d. Pylon to external fuel tank fuel/air coupling valves.

**15. External Fuel Tank to Pylon Fuel and Air Probes.** Fuel and air probes located on the external tank, serves as tank/pylon interface by opening the fuel and air coupling valves within the pylon.

**16. Centerline Pylon Flame Arrestor.** The pylon flame arrestor is mounted in the refuel/transfer line. In case of fire in the external tank, the flame arrestor prevents fire from entering fuel lines in the fuselage.

**17. Wing Pylon Flame Arrestor.** The wing pylon flame arrestor is mounted in the refuel/transfer line of the wing pylon. In case of fire in the external tank, the flame arrestor prevents fire from entering fuel lines in the wing tank.

**18. External Tank Refuel/Transfer Shutoff Valve.** The external tank refuel/transfer shutoff valve is a two way operating valve, located inside the external fuel tank, which controls refuel and transfer of the tank. Operation of the shutoff valve can be checked during ground precheck (WP003 01).

**19. External Tank Fuel Level Control Pilot Valve.** The external tank fuel level control pilot valve is a float operated valve which controls the refuel/transfer shutoff valve during refueling. When the pilot valve closes, it provides a pressure signal to the shutoff valve, causing it to close (WP003 01).

**20. Refuel/Transfer Check Valve.** The external tank refuel/transfer check valve prevents back flow from the fuel level control pilot valve to the refuel/transfer shutoff valve during external tank transfer. Back flow would stop fuel transfer.

**21. External Tank Manual Precheck Valve.** The manual precheck valve is used to precheck the external tank without the use of electrical power. The valve control is mounted on the outside surface of the external tank (WP003 01).

**22. External Fuel Tank Jettison Pivot.** The jettison pivot is located near the aft end of the external tank and locks into the pylon. The pivot provides a rotation point for the tank, during external tank jettison, until aerodynamic forces carry the tank clear of the aircraft.

**23. RELATED SYSTEMS.** Systems related to the external fuel system are described below:

**24. Pressurization and Vent System.** The pressurization and vent system (WP019 00) provides a positive regulated pressure of 15 to 18psi to the external fuel system for external tank transfer.

**25. Maintenance Status Display and Recording System (MSDRS)** The maintenance status display and recording system receives inputs from the fuel system through the signal data converter and recorder. The MSDRS signal data recorder sends data to the mission computer system for processing. If the mission computer system detects a fuel

system failure, it sends the applicable maintenance code to the MSDRS signal data recorder which sends it to the nose wheelwell Digital Display Indicator ID-2150/ASM-612 for storage and display (A1-F18AC-580-100, WP005 00).

**26. Mission Computer System.** The mission computer system receives fuel system data from the MSDRS. Digital data computer no. 1 processes the data to determine when a fuel system failure or caution condition occurs. If a failure occurs, digital data computer no. 1 sends the applicable maintenance code to the MSDRS for storage and display. If a caution condition occurs, digital data computer no. 1 sends the caution message to the multipurpose display group for display (A1-F18AC-741-100, WP003 00).

**27. Multipurpose Display Group.** If the mission computer system detects a fuel system caution condition, it sends the caution message to the multipurpose display group. The left Digital Display Indicator IP-1317( ) and on F/A-18B, the rear left Digital Display Indicator IP-1318( ) receive and display the caution messages (A1-F18AC-745-100, WP003 00).

**28. SYSTEM CONTROLS AND INDICATORS.** The external fuel system controls and indicators are listed below and shown in WP010 00.

**29. Digital Display Indicator IP-2150/ASM-612.** Digital Display Indicator ID-2150/ASM-612 in the nose wheelwell stores and displays external fuel system maintenance failure code 951 - external tank pressurization system is overpressurized.

**30. Arresting Hook Control.** When the HOOK control handle is positioned down, the external tanks depressurize (WP019 00) and transfer stops.

**31. FUEL System Control Panel.** The FUEL system control panel consists of switches listed below:

- a. EXT TANKS - WING switch.
- b. EXT TANKS - CTR switch.
- c. PROBE control switch (WP008 00).
- d. DUMP switch (WP017 00).

**32. EXT TANKS Switches.** The EXT TANK CTR/ WING switches are three position switches, which con-

trol external tank refueling, transfer and ground pressurization. Switch positions and functions are listed below:

a. Norm - allows refuel and transfer of the external tank.

b. STOP - closes the refuel/transfer electrical solenoid which stops refuel/transfer of the external tank.

c. OVERRIDE - allows pressurization (WP019 00) of the external tank for external tank transfer when weight is on wheels, provided the arresting HOOK control handle is up.

**33. Fuel Check Panel.** The fuel check panel, in door 8, consists of switches listed below:

a. EXT FTK CHK switches (161353 THRU 161761 BEFORE F/A-18 AFC 39).

b. EXT TK PRCHK SW (161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39).

c. TK INTCON V CHK (WP012 00).

**34.** The EXT FTK CHK switches (161353 THRU 161761 BEFORE F/A-18 AFC 39) or EXT TK PRCHK SW (161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39) allow electrical pre-checking of the external fuel tanks during refueling.

**35. MASTER CAUTION Light.** The MASTER CAUTION light is on the LH advisory and threat warning indicator panel. The yellow caution light indicates a fuel system malfunction requiring attention but no immediate action.

**36. Digital Display Indicator IP-1317( ), IP-1318( ).** EXT TANK caution display will appear on left Digital Display Indicator IP-1317( ) in the cockpit and on F/A-18B, left Digital Display Indicator IP-1318( ) in the rear cockpit if the external tanks have not depressurized (within 2 minutes of weight on wheels condition) on the ground.

**37. OPERATION.**

**38. COMPONENT OPERATION.** Operation of the external fuel tank refuel/transfer shutoff valve, external fuel tank manual precheck valve, and

external tank fuel level control pilot valve are shown in WP003 01.

**39. External Tank Pressurization and Vent Valve.** Air displaced during refueling or from thermal expansion is relieved through the pressurization and vent valve. Increased air pressure inside the external tank causes the vent valve to open and relieve through the external tank relief vent.

40. During transfer, the pressurization and vent valve pressurizes the external tank with 15 to 18psi of regulated air. When air pressure exceeds 15 to 18psi, the valve opens, allowing excess pressure to bleed off through the external tank relief vent.

41. During aircraft catapult, arrestment, and high climb operations, the pressurization and vent valve closes to prevent fuel venting through the external tank relief vent. In negative G conditions, outside air enters through the pressurization and vent valve suction relief valve to equalize the pressure within the external tank.

42. **SYSTEM OPERATION.** A simplified schematic in WP011 00 and component locator in WP010 00 show details of the external fuel system.

43. **Precheck.** By positioning the external tank manual precheck valve to precheck during refueling, fuel is routed to the fuel level control pilot valve. When the pilot valve closes, generated pressure signals cause the refuel/transfer shutoff valve to close and stop refuel (WP003 01), proving the refuel/transfer shutoff valve will close when the tank is full.

44. When refueling with electrical power, external tank precheck is done using the three EXT F TK CHK switches (161353 THRU 161761 BEFORE F/A-18 AFC 39) or single EXT TK PRECHK SW (161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39) on the fuel check panel in door 8. Electrical precheck closes a solenoid in each tank fuel level control pilot valve which causes the refuel/transfer shutoff valve to close and stop refueling (WP003 01).

45. **Refueling.** External tank(s) refueling (WP005 00) is done through the ground refuel/defuel receptacle in door 8 or the inflight refueling probe (WP008 00). To prevent fuel spillage during refueling, each external tank refuel/transfer shutoff valve is prechecked.

46. During refueling with electrical power or inflight refueling, refueling can be stopped at any time using the EXT TANKS WING/CTR switches on the cockpit FUEL system control panel. By setting the WING and/or CTR switch(es) to STOP, an electrical solenoid closes the refuel/transfer shutoff valve and stops refueling (WP003 01).

47. **External Transfer.** The external tanks are pressurized with 15 to 18psi regulated air supplied by the fuel pressurization and vent system (WP019 00). Pressurized, fuel in the external tank opens the refuel/transfer shutoff valve (WP003 01) and flows to any internal tank which will accept fuel. The refuel/transfer shutoff valve stops transfer when the external tank empties.

48. External tank transfer can be stopped using the EXT TANKS WING/CTR switches. When set to STOP, the electrical solenoid closes the refuel/transfer shutoff valve and stops transfer. External tank transfer resumes automatically if tank 2 or tank 3 depletes below 800  $\pm$ 100 pounds (WP023 00).

49. Normally, with weight-on-wheels, external tank transfer is stopped. When the EXT TANKS WING/CTR switch(es) on the cockpit FUEL system control panel are set to OVERRIDE, external tanks can be pressurized (WP019 00) for transfer, provided the HOOK control handle is positioned up.

50. **Jettison.** The external tanks can be jettisoned selectively or all at one time (A1-F18AC-740-100, WP035 00). External tank to pylon fuel/air coupling valves will automatically close the fuel transfer and air pressurization tubes when the tanks are jettisoned.

51. When any tank is jettisoned, a jettison pivot on the aft end of the tank provides a center of rotation for the tank until aerodynamic forces carry the tank clear of the aircraft.

52. **External Fuel System Caution Maintenance Codes.** Cautions are displayed on left cockpit DDI IP-1317( ), IP-1318( ) and light the MASTER CAUTION light. Codes are displayed on nose wheelwell DDI ID-2150/ASM-612. External fuel system cautions/codes are explained below.

53. EXT TANK. Caution indicates external tanks have not depressurized (within 2 minutes of weight on wheels condition) on the ground.

54. Code 951. Code indicates external tank pressurization system is overpressurized. (Code can be set with or without external tanks on board.)

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**ORGANIZATIONAL MAINTENANCE****PRINCIPLES OF OPERATION****COMPONENT LOCATOR****EXTERNAL FUEL SYSTEM**

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**Reference Material**

None

**Alphabetical Index****Subject****Page No.**

External Fuel System Component Locator, Figure 1 ..... 2

**Record of Applicable Technical Directives**

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 AFC 41	-	Throttle Thrust Sensitivity, Reduction of (ECP MDA F/A-18-00054C1)	1 Nov 86	-
F/A-18 AFC 39	-	No. 1 Fuel Tank Interconnect Valve Replace- ment and Fuel Sequencing Modification (ECP MDA-F/A-18-00072C1)	1 Nov 86	-

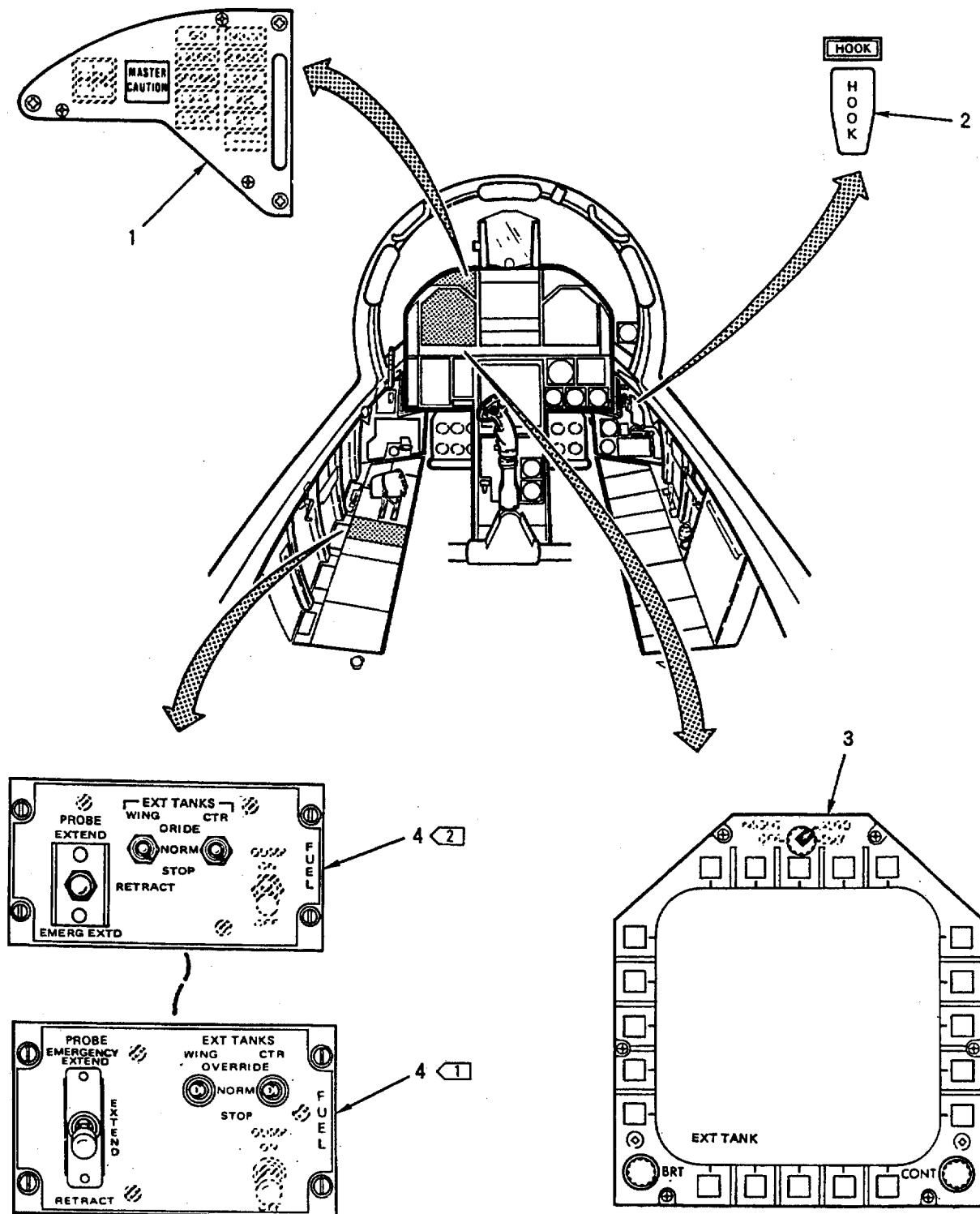
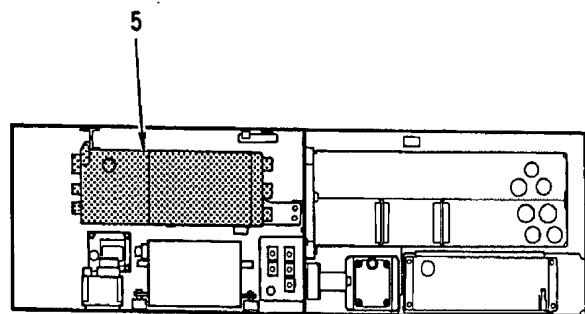
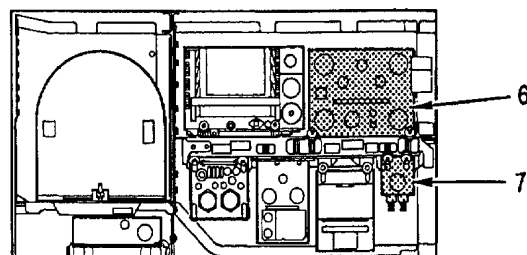


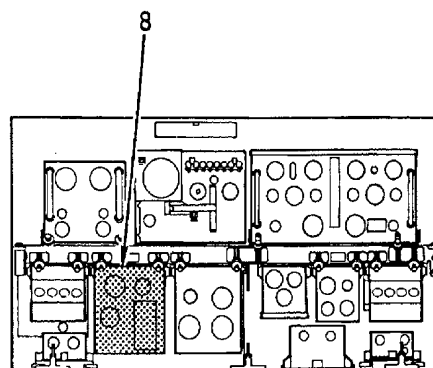
Figure 1. External Fuel System Component Locator (Sheet 1)



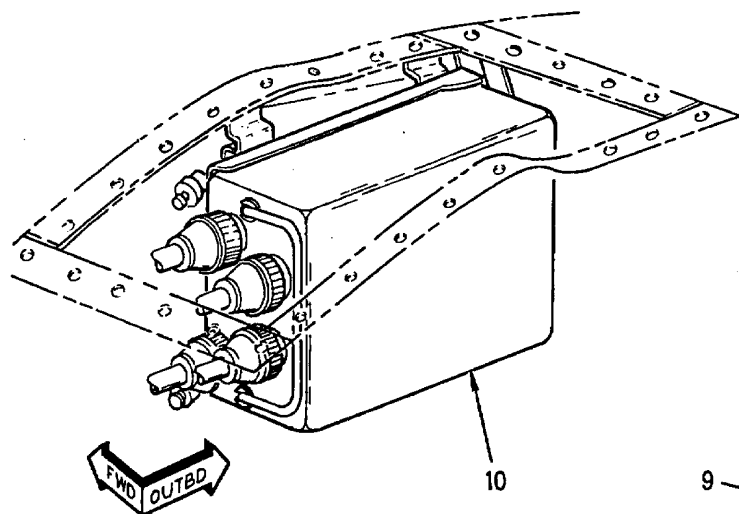
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DOOR 10L



← FWD  
DOOR 13L

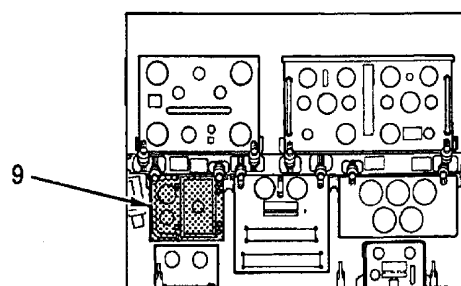


→ FWD  
DOOR 13R



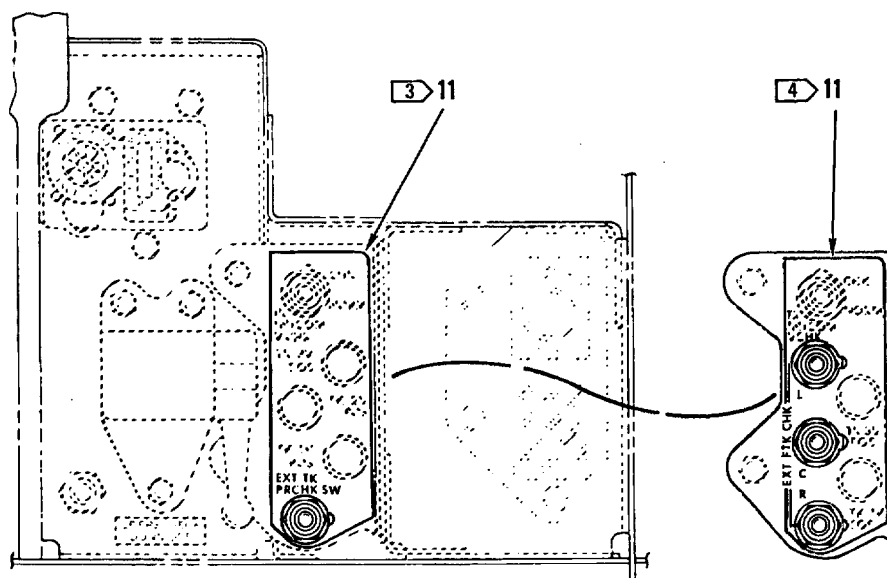
↘ FWD OUTBD

DOOR 32R

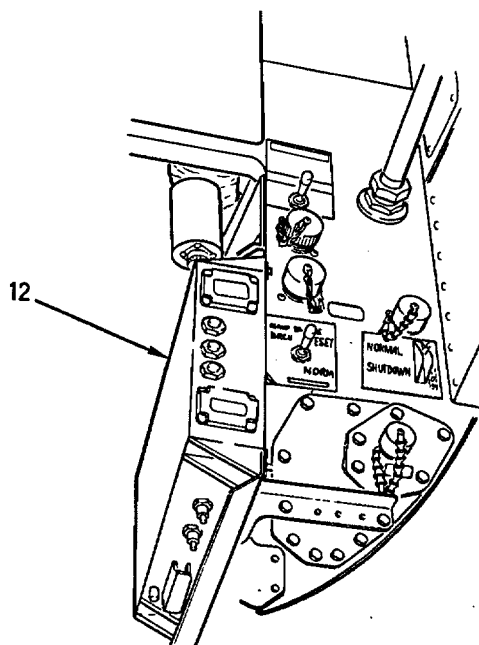


→ FWD  
DOOR 14R

Figure 1. External Fuel System Component Locator (Sheet 2)



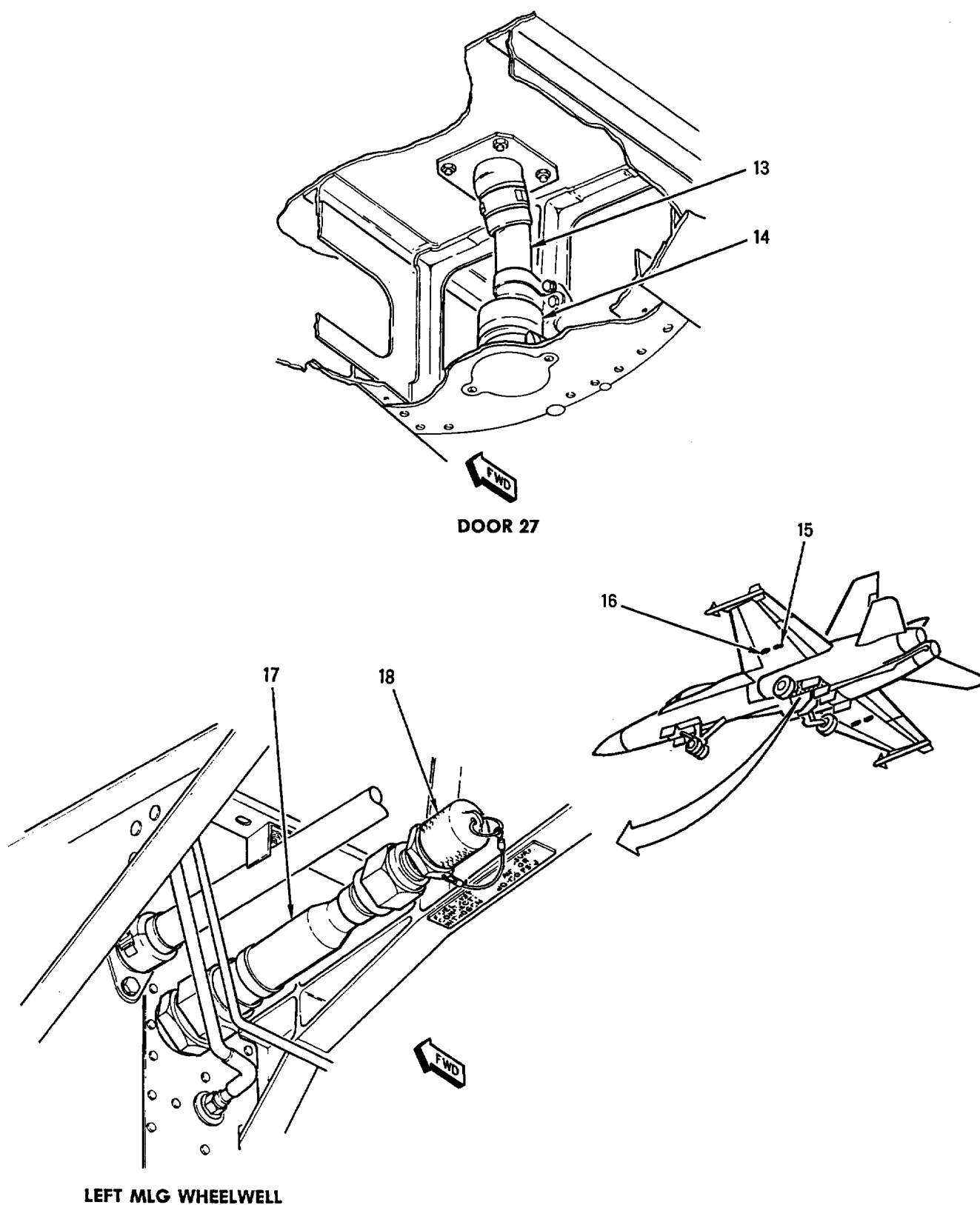
DOOR 8



NOSE WHEELWELL, LEFT SIDE  
LOOKING AFT AND OUTB'D

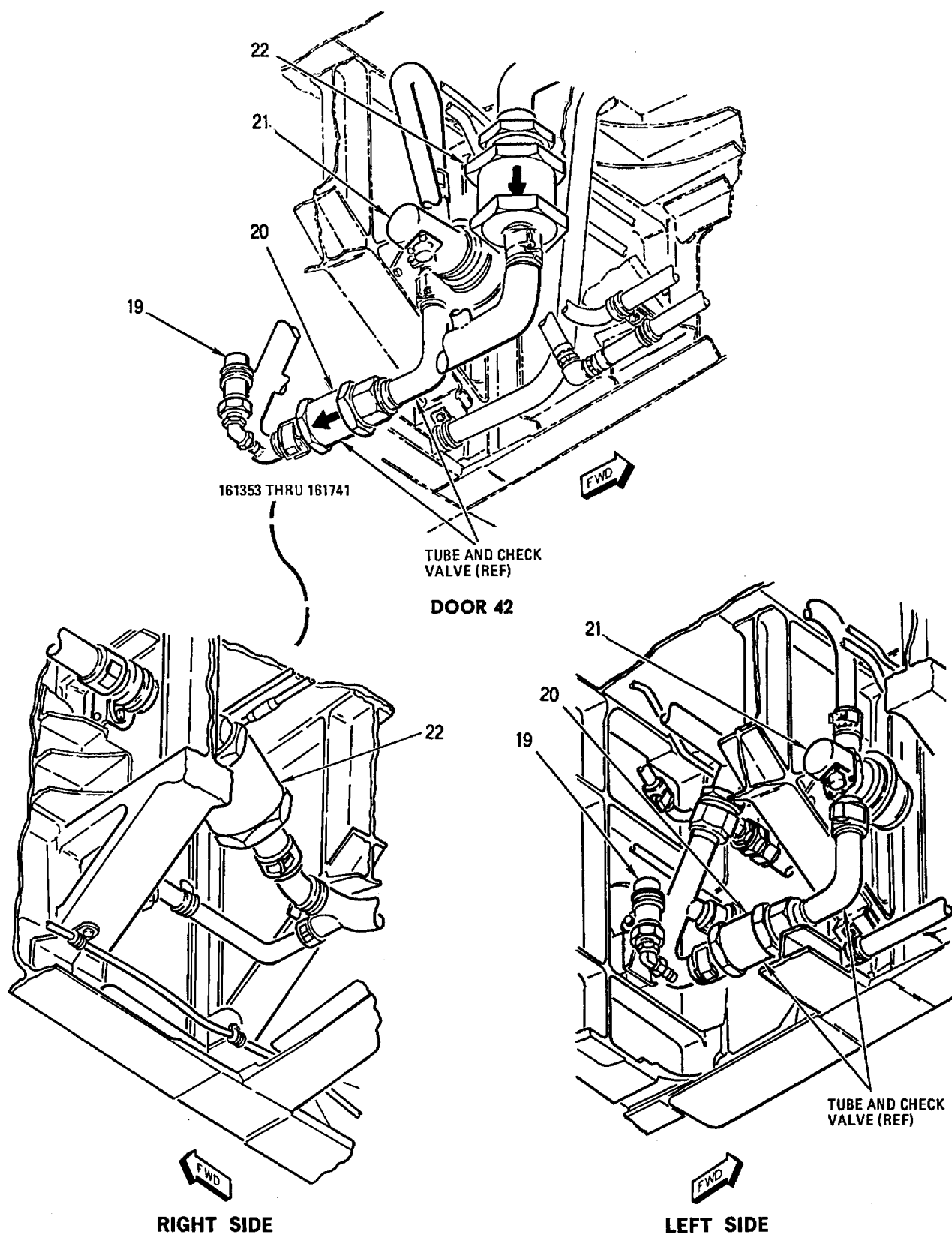
Figure 1. External Fuel System Component Locator (Sheet 3)





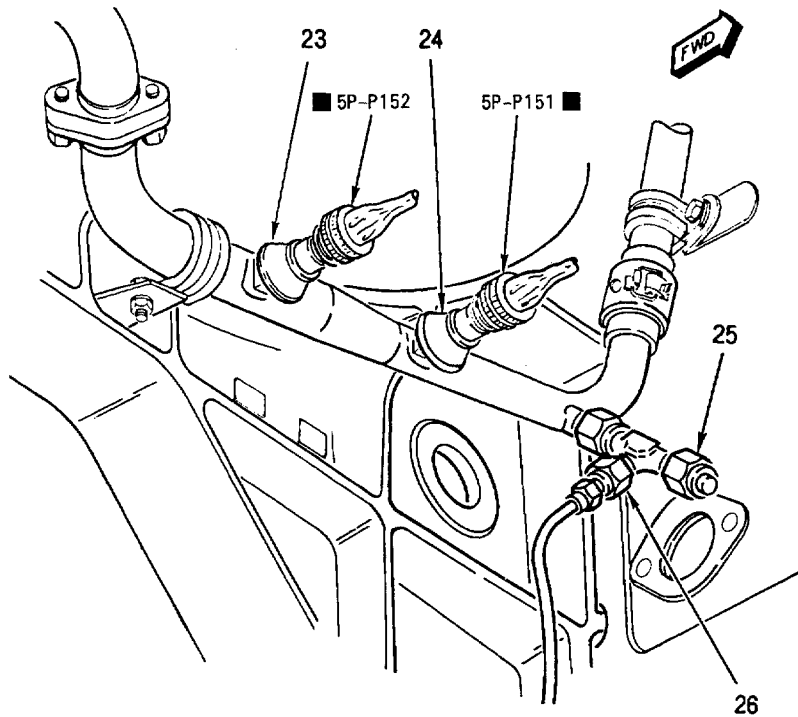
18AC-460-10-(29-4)19

Figure 1. External Fuel System Component Locator (Sheet 4)

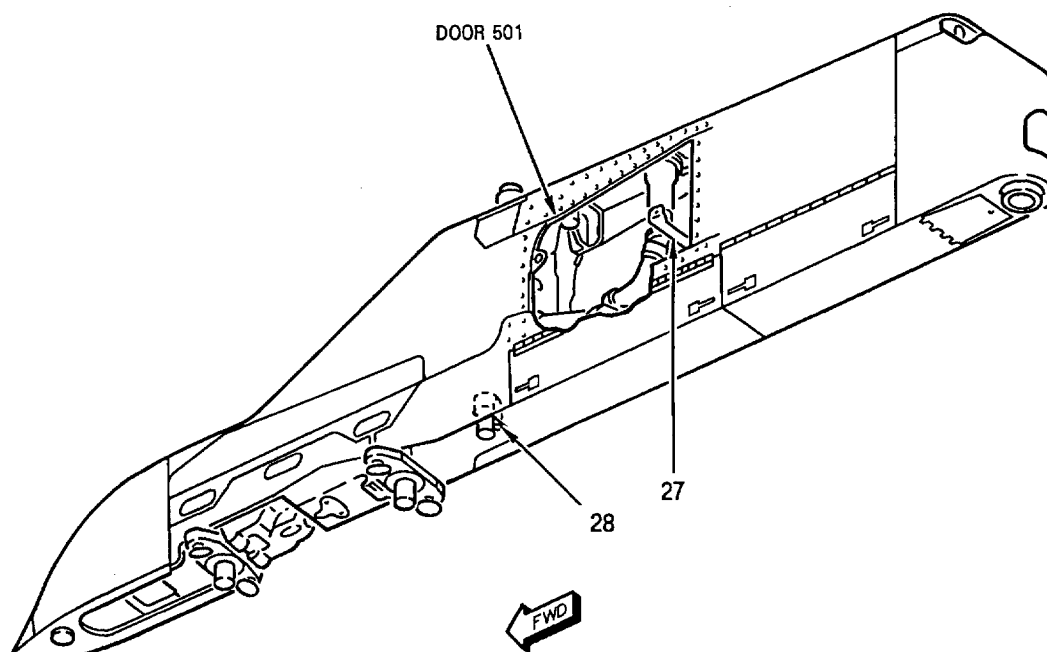


18AC-460-10-(29-5)19

Figure 1. External Fuel System Component Locator (Sheet 5)



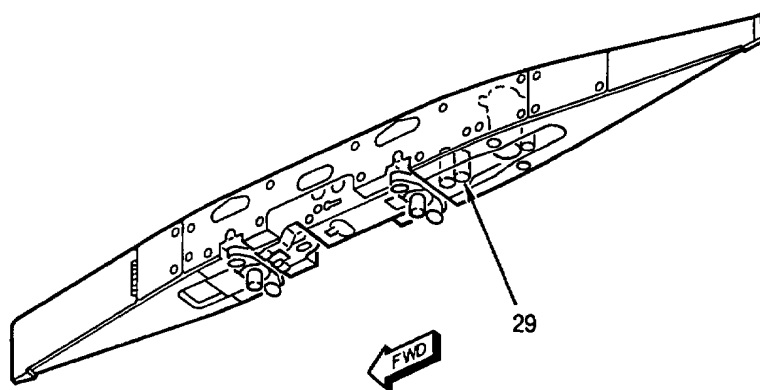
**LEFT MLG WHEELWELL**



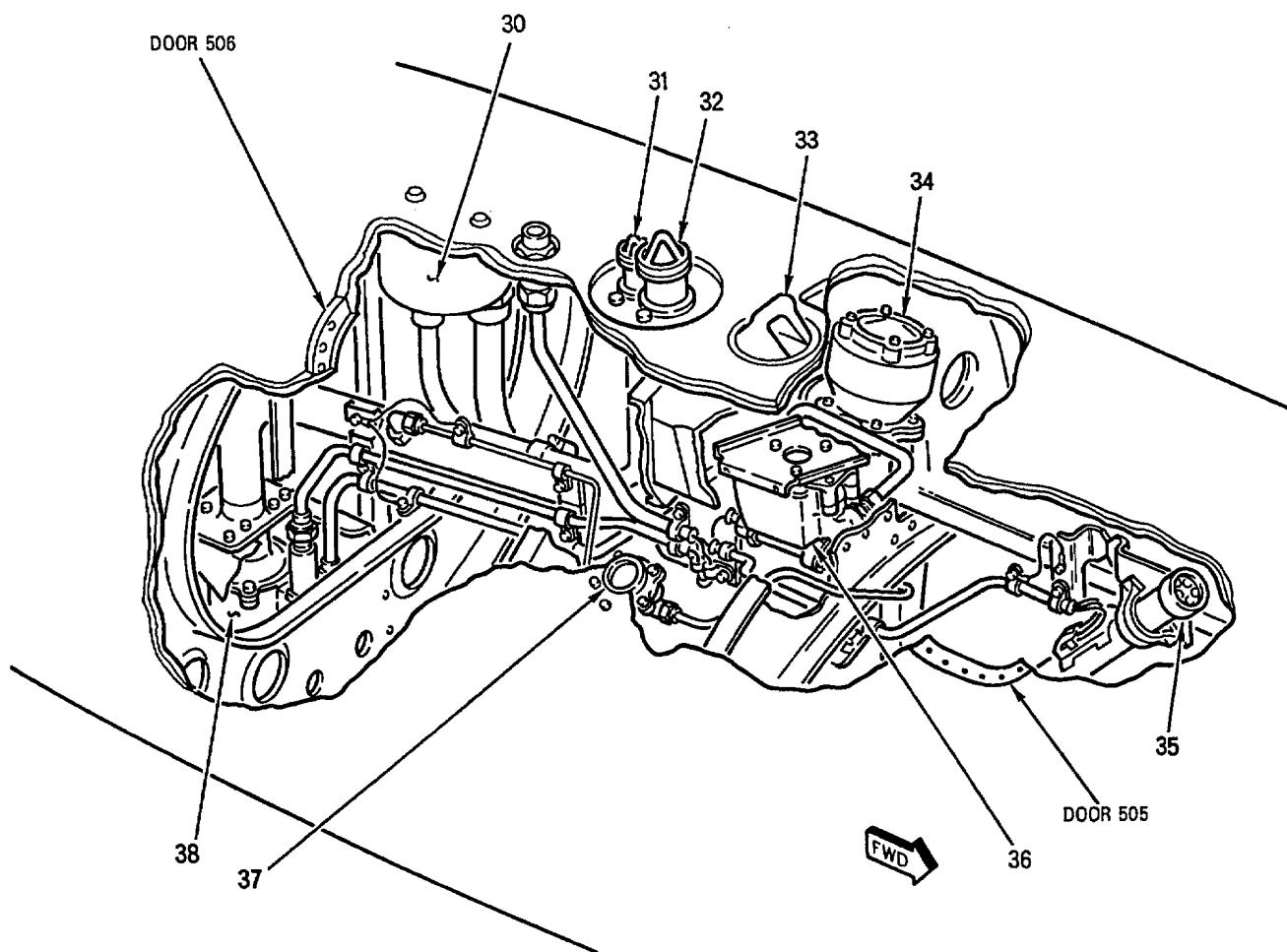
**R/L WING PYLON**

18AC-460-10-(29-6)23

**Figure 1. External Fuel System Component Locator (Sheet 6)**



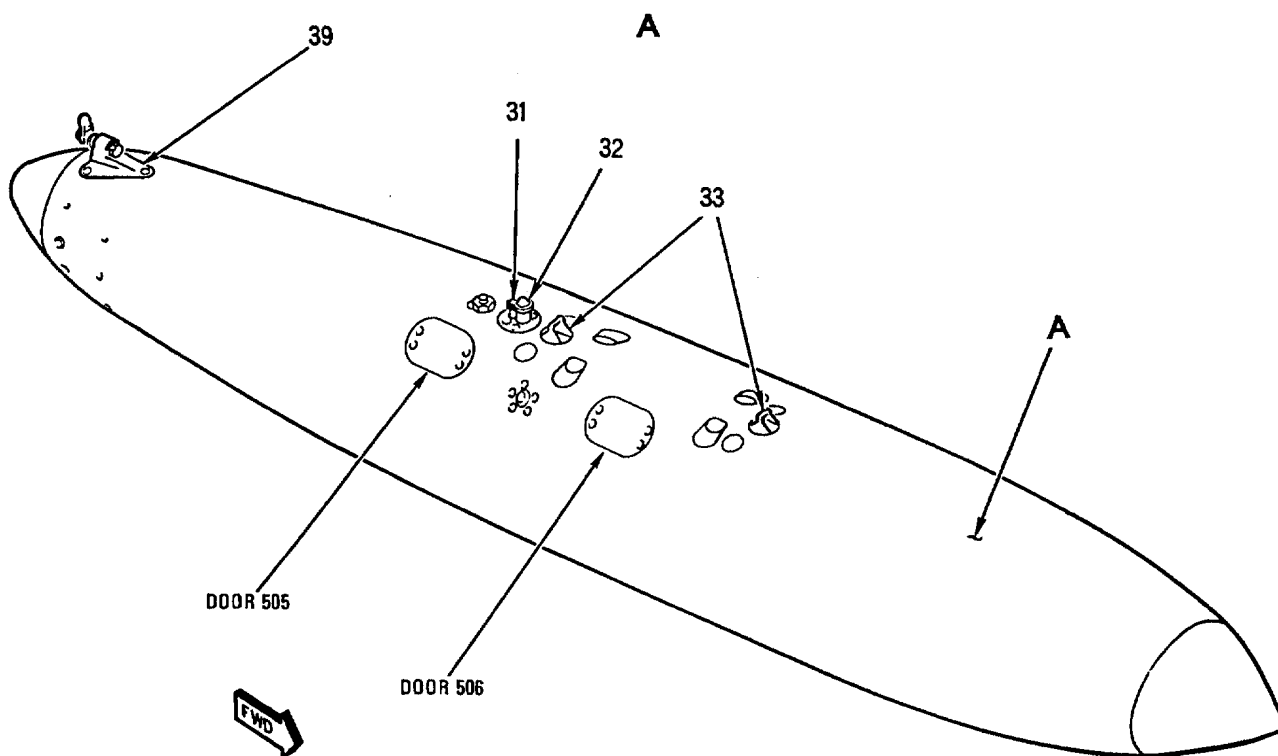
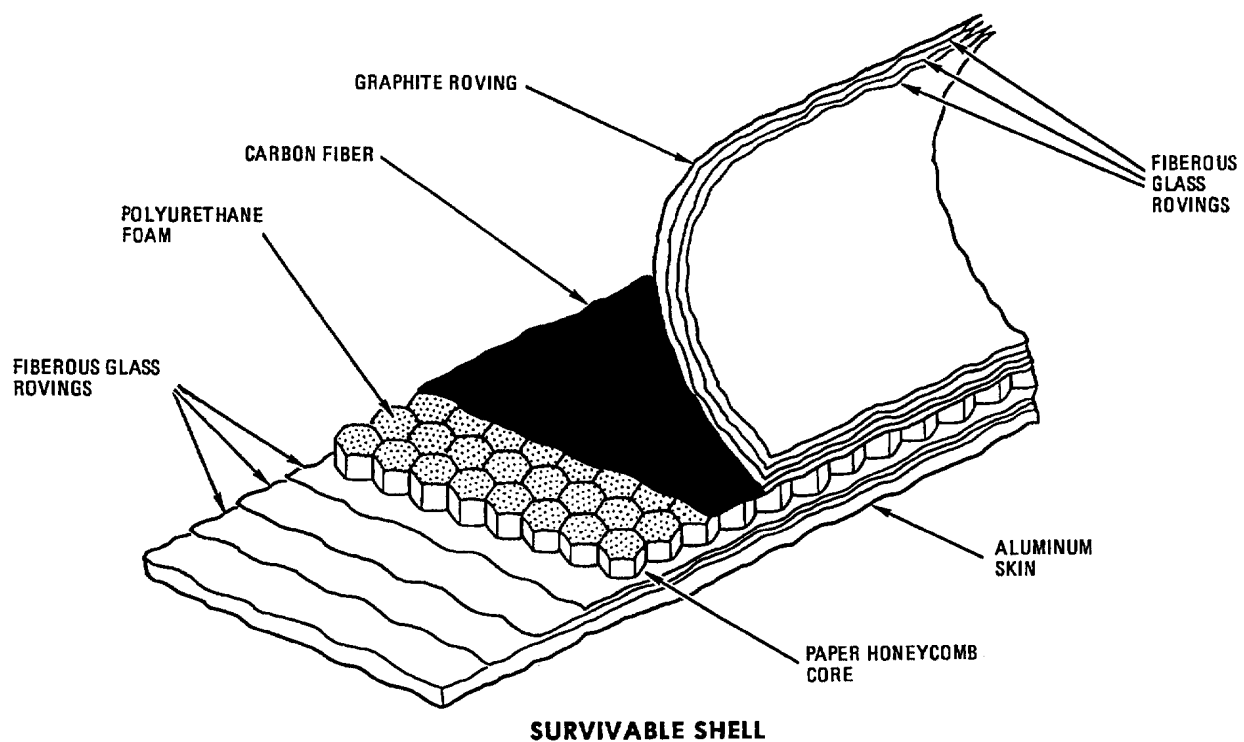
**CENTERLINE PYLON**



**AIRCRAFT FUEL TANK FPU-6/A(ELLIPTICAL)**

18AC-460-10-(29-7)19

**Figure 1. External Fuel System Component Locator (Sheet 7)**



AIRCRAFT FUEL TANK FPU-6/A(ELLIPTICAL)

18AC-460-10-(29-8)J

Figure 1. External Fuel System Component Locator (Sheet 8)

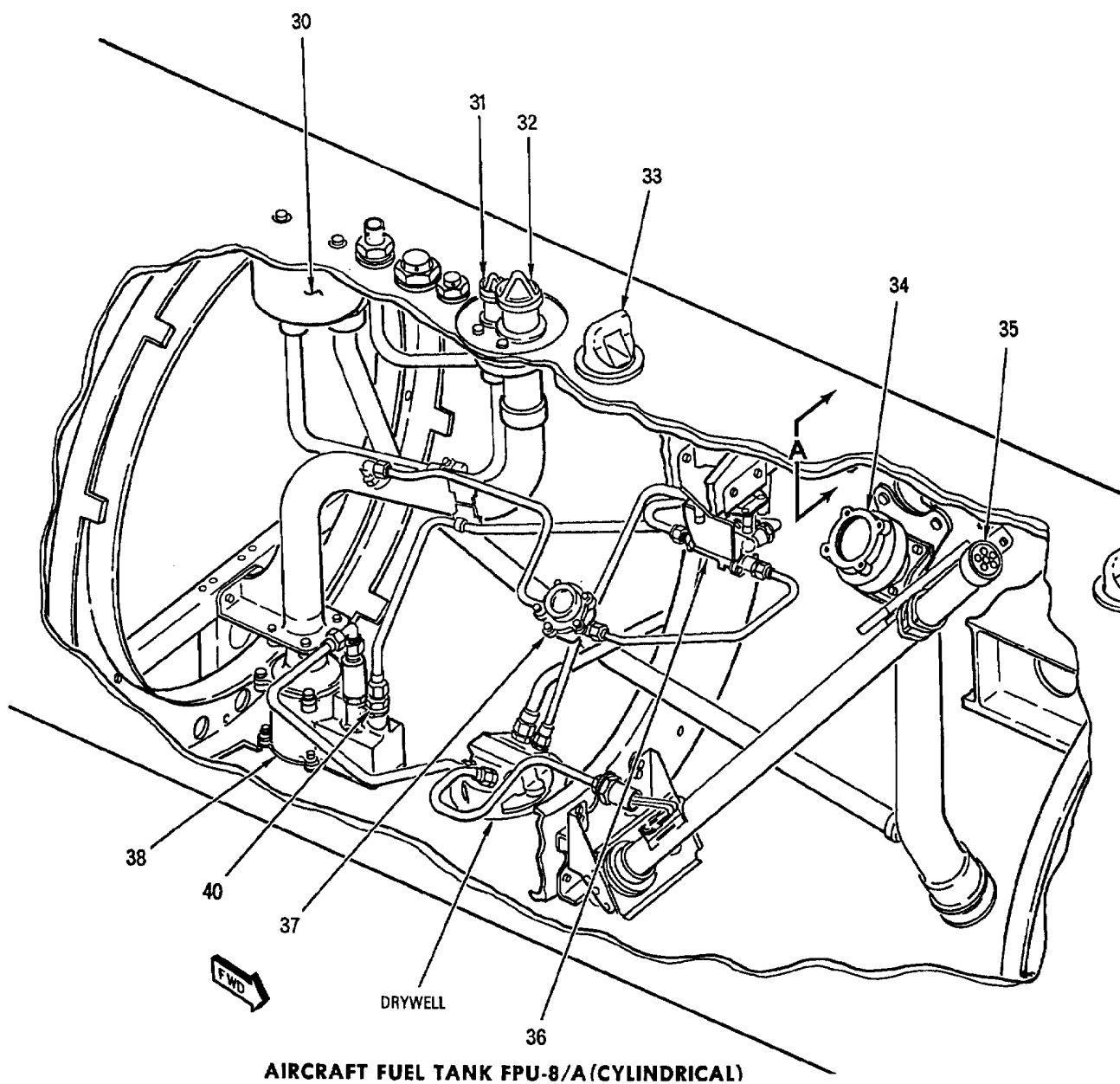
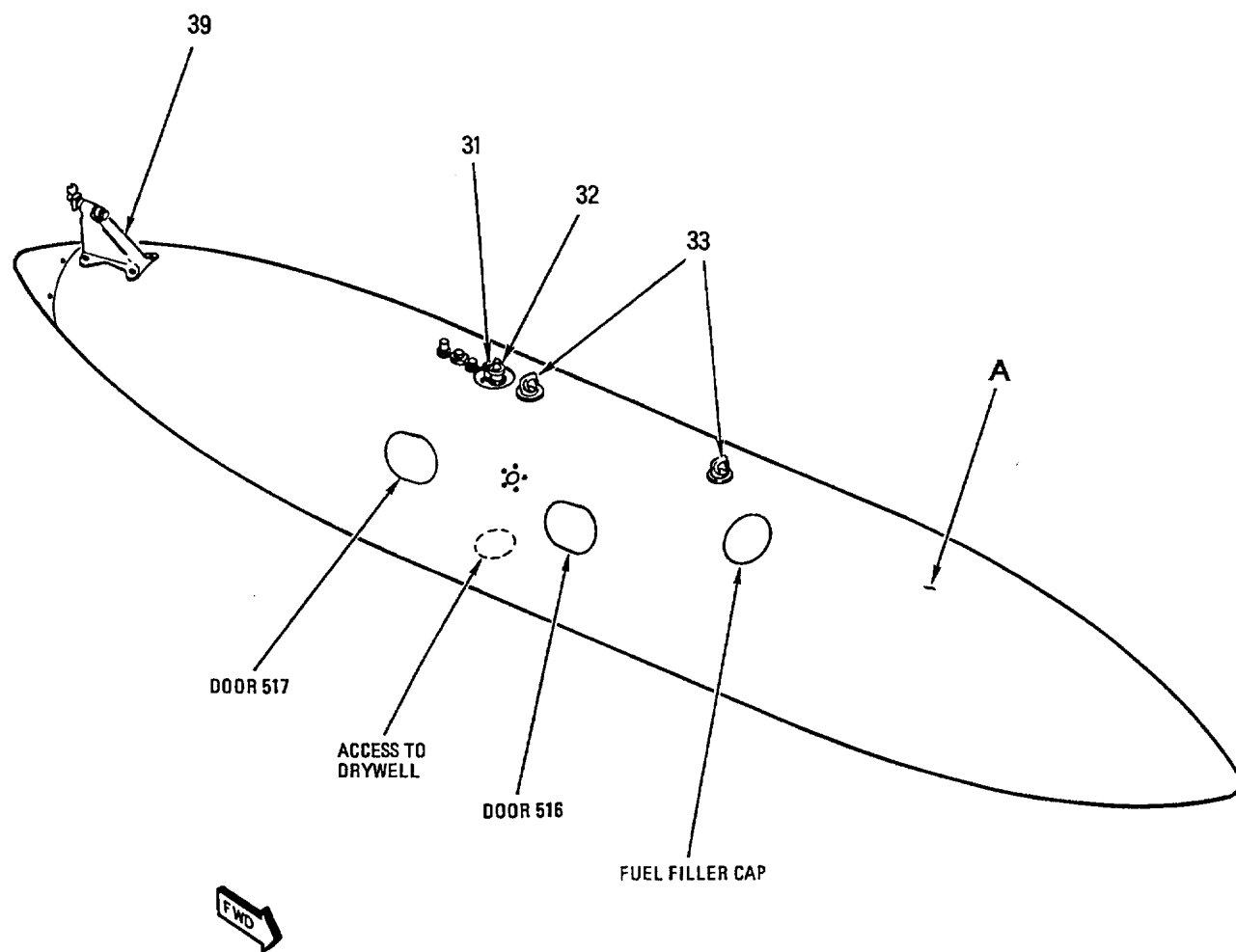


Figure 1. External Fuel System Component Locator (Sheet 9)



AIRCRAFT FUEL TANK FPU-8/A(CYLINDRICAL)

Figure 1. External Fuel System Component Locator (Sheet 10)

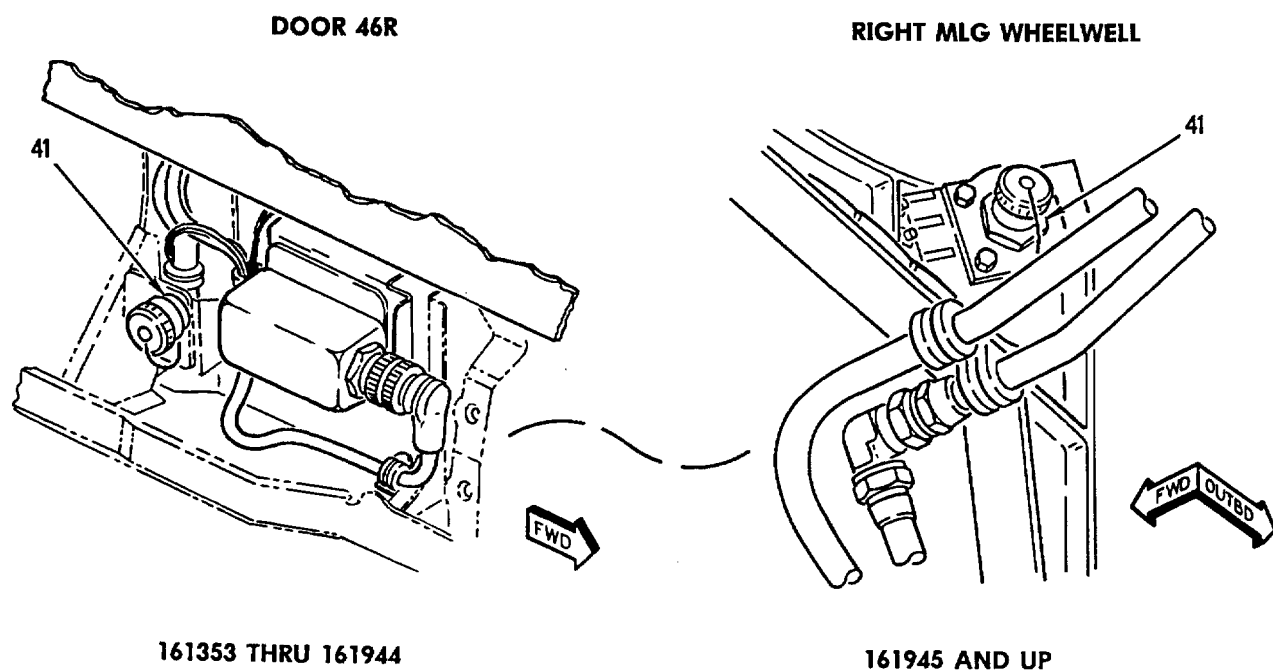


Figure 1. External Fuel System Component Locator (Sheet 11)



## LEGEND

1	161353 THRU 161528 BEFORE F/A-18 AFC 41.
2	161702 AND UP; ALSO 161353 THRU 161528 AFTER F/A-18 AFC 41.
3	161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39.
4	161353 THRU 161761 BEFORE F/A-18 AFC 39.

Nomenclature	Index No.	Ref Des
ARRESTING HOOK CONTROL HANDLE	2	19A-J003
BLEED AIR CHECK VALVE	22	5VAT506
CENTERLINE PYLON TO EXTERNAL TANK FUEL/AIR COUPLING VALVE	29	5VAZ629
CENTERLINE PYLON FLAME ARRESTOR	13	5VAR525
CONTROL CONVERTER C-10382/A	8	82A-F001
DIGITAL DATA COMPUTER NO. 1	6	83A-E001
DIGITAL DISPLAY INDICATOR ID-2150/ASM-612	12	85A-G003
EXTERNAL FUEL PRESSURIZATION BLEED ORIFICE	26	5VAP654
EXTERNAL FUEL SYSTEM AIR PRESSURE SWITCH (5 PSI)	24	5S-P151
EXTERNAL FUEL SYSTEM AIR PRESSURE SWITCH (34 PSI)	23	5S-P152
EXTERNAL FUEL SYSTEM GROUND TEST CONNECTOR	25	
EXTERNAL FUEL TANK		
FUEL LEVEL CONTROL PILOT VALVE	36	5L-Y060
FUEL QUANTITY TRANSMITTER	35	5L-Y062
JETTISON PIVOT	39	5VAY631
MANUAL PRECHECK VALVE	37	5VAY641
PRESSURE RELIEF VALVE	34	5VAR620
PRESSURIZATION AND VENT VALVE	30	5VAY688
REFUEL/TRANSFER CHECK VALVE	40	5L-Y061
REFUEL/TRANSFER SHUTOFF VALVE	38	5VAY642
TO PYLON AIR PROBE	31	5VAY637
TO PYLON FUEL PROBE	32	
EXTERNAL TANKS AIR PRESSURE REGULATOR	21	5L-P102

Figure 1. External Fuel System Component Locator (Sheet 12)

Nomenclature	Index No.	Ref Des
EXTERNAL TANK AIR PRESSURE REGULATOR CHECK VALVE	20	5VAR620
EXTERNAL TANKS AIR PRESSURE TRANSDUCER	19	5MTR130
FUEL CHECK PANEL	11	5A-B019
4 L EXT F TK CHK SWITCH		5S-B022
4 R EXT F TK CHK SWITCH		5S-B020
4 C EXT F TK CHK SWITCH		5S-B021
3 EXT TK PRCHK SW		5S-B020
FUEL GROUND TEST RECEPTACLE	41	5J-R135
FUEL SYSTEM CONTROL PANEL	4	5A-H027
EXT TANKS WING SWITCH		5S-H017
EXT TANKS CTR SWITCH		5S-H018
PROBE CONTROL SWITCH		5S-H005
FUSELAGE TO PYLON FUEL COUPLING VALVE	14	5VAR522
GROUND AIR PRESSURIZATION CONNECTOR	18	5PAP636
GROUND AIR PRESSURIZATION FILTER	17	5FAP638
LEFT DIGITAL DISPLAY INDICATOR IP-1317( )	3	80A-H001
LH ADVISORY AND THREAT WARNING INDICATOR PANEL	1	52A-H073
NO. 3 RELAY PANEL ASSEMBLY	7	52A-E059
LMG WOW RELAY NO. 4		12K-E020
NO. 8 CIRCUIT BREAKER RELAY PANEL ASSEMBLY	5	52A-C159
EXT FUEL TK CONT CIRCUIT BREAKER (ZONE A8)		5CBC016
3 EXTERNAL TANK PRECHECK RELAY		5K-C168
EXTERNAL TANK REFUEL CONTROL RELAY		5K-C107
FUEL LOW LEVEL RELAY NO. 2		5K-C052
FUEL TK PRESS CIRCUIT BREAKER (ZONE A6)		5CBC101
SIGNAL DATA CONVERTER CV-3493 ASM-612	10	85A-N002
SIGNAL DATA RECORDER RO-508 ASM-612	9	85A-F001
SUSPENSION LUGS	33	

Figure 1. External Fuel System Component Locator (Sheet 13)

Nomenclature	Index No.	Ref Des
WING AIR COUPLING VALVE LEFT RIGHT	15	5VAU577 5VAV578
WING FUEL COUPLING VALVE LEFT RIGHT	16	5VAU575 5VAV589
WING PYLON FLAME ARRESTOR	27	5VAW673
WING PYLON TO EXTERNAL TANK FUEL AIR COUPLING VALVE	28	5VAW623

Figure 1. External Fuel System Component Locator (Sheet 14)



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**ORGANIZATIONAL MAINTENANCE****PRINCIPLES OF OPERATION****SIMPLIFIED SCHEMATIC****EXTERNAL FUEL SYSTEM**

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**Reference Material**

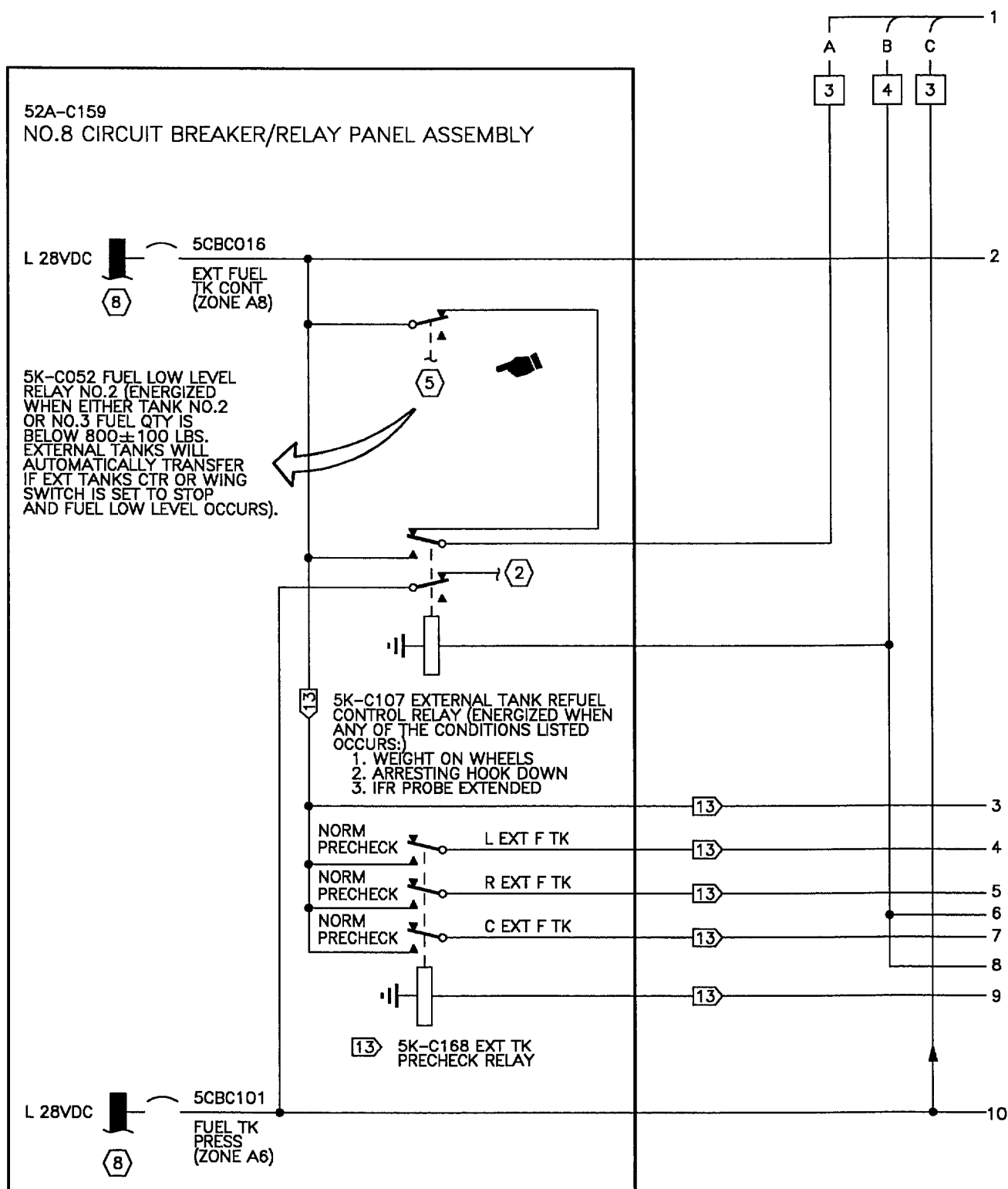
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**Alphabetical Index****Subject****Page No.**

External Fuel System Simplified Schematic, Figure 1 ..... 2

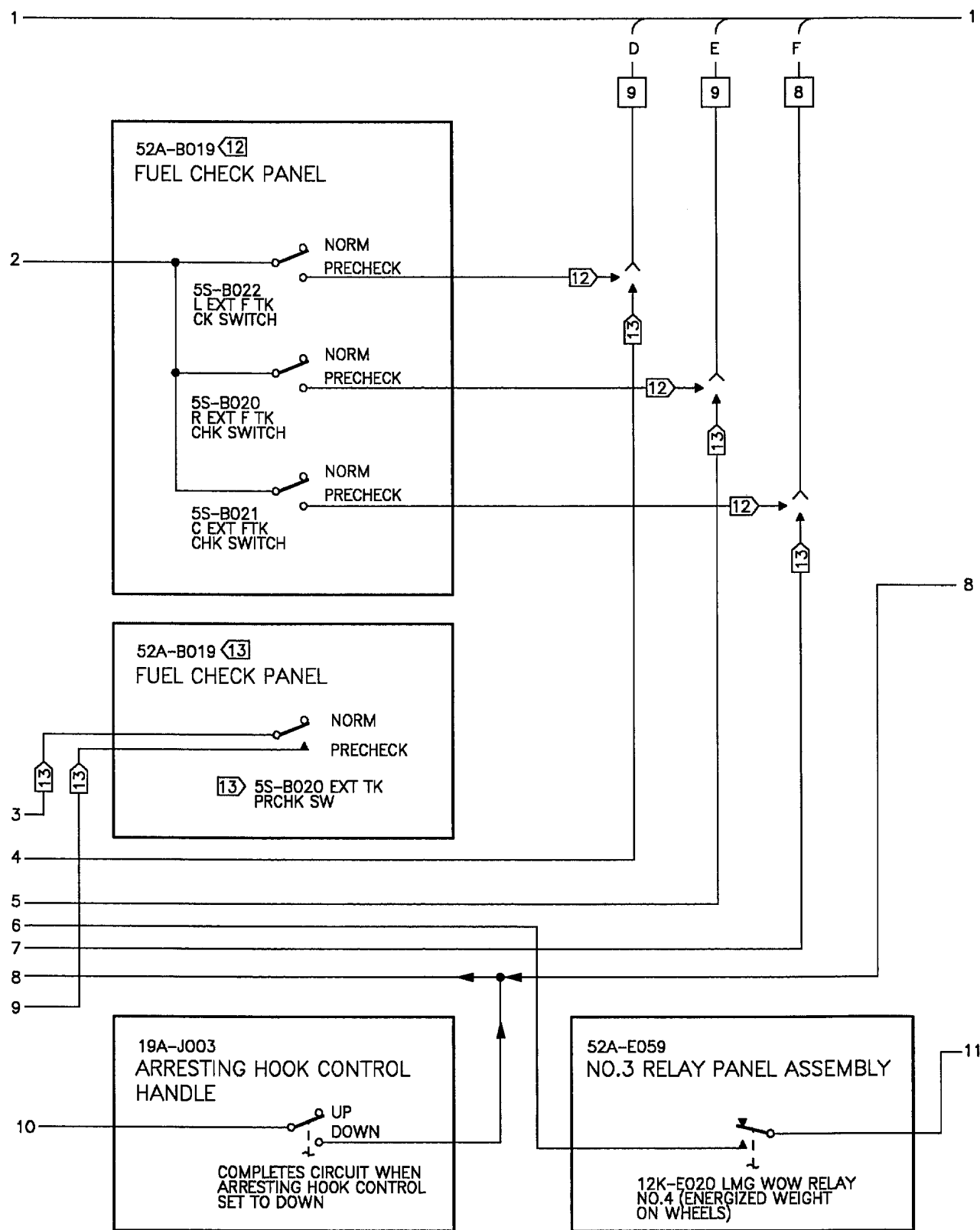
**Record of Applicable Technical Directives**

<b>Type/ Number</b>	<b>Date</b>	<b>Title and ECP No.</b>	<b>Date Incorp.</b>	<b>Remarks</b>
F/A-18 AFC 41	-	Installation of Equipment, Structure, Wiring and Attaching Hardware (ECP-MDA- F/A-18-00054C1)	1 Nov 86	-
F/A-18 AFC 39	-	No. 1 Fuel Tank Interconnect Valve Replace- ment and Fuel Sequencing Modification (ECP MDA-F/A-18-00072C1)	1 Nov 86	-



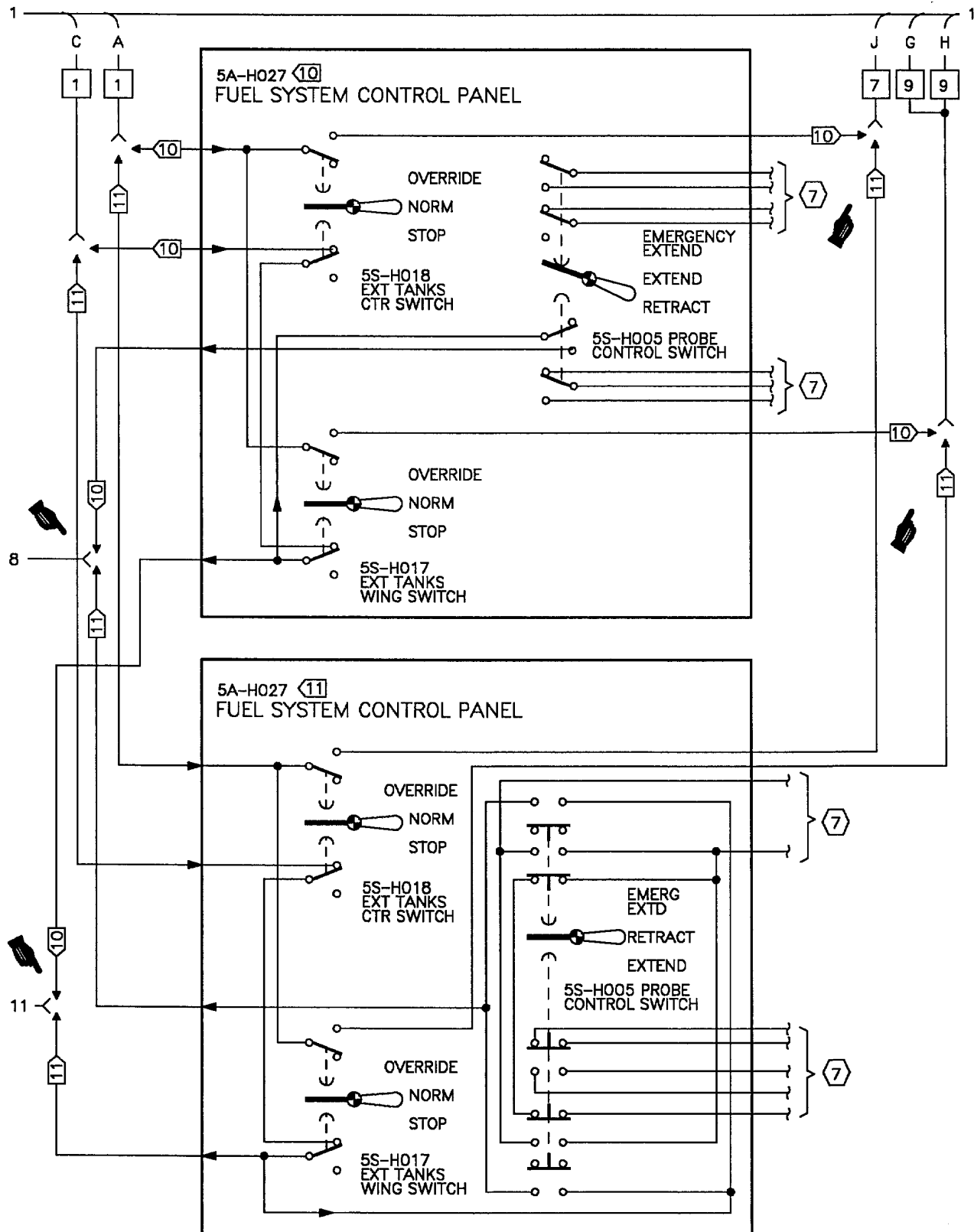
18AC-460-10-(28-1)22-CATI

Figure 1. External Fuel System Simplified Schematic (Sheet 1)



18AC-460-10-(28-2)H-CATI

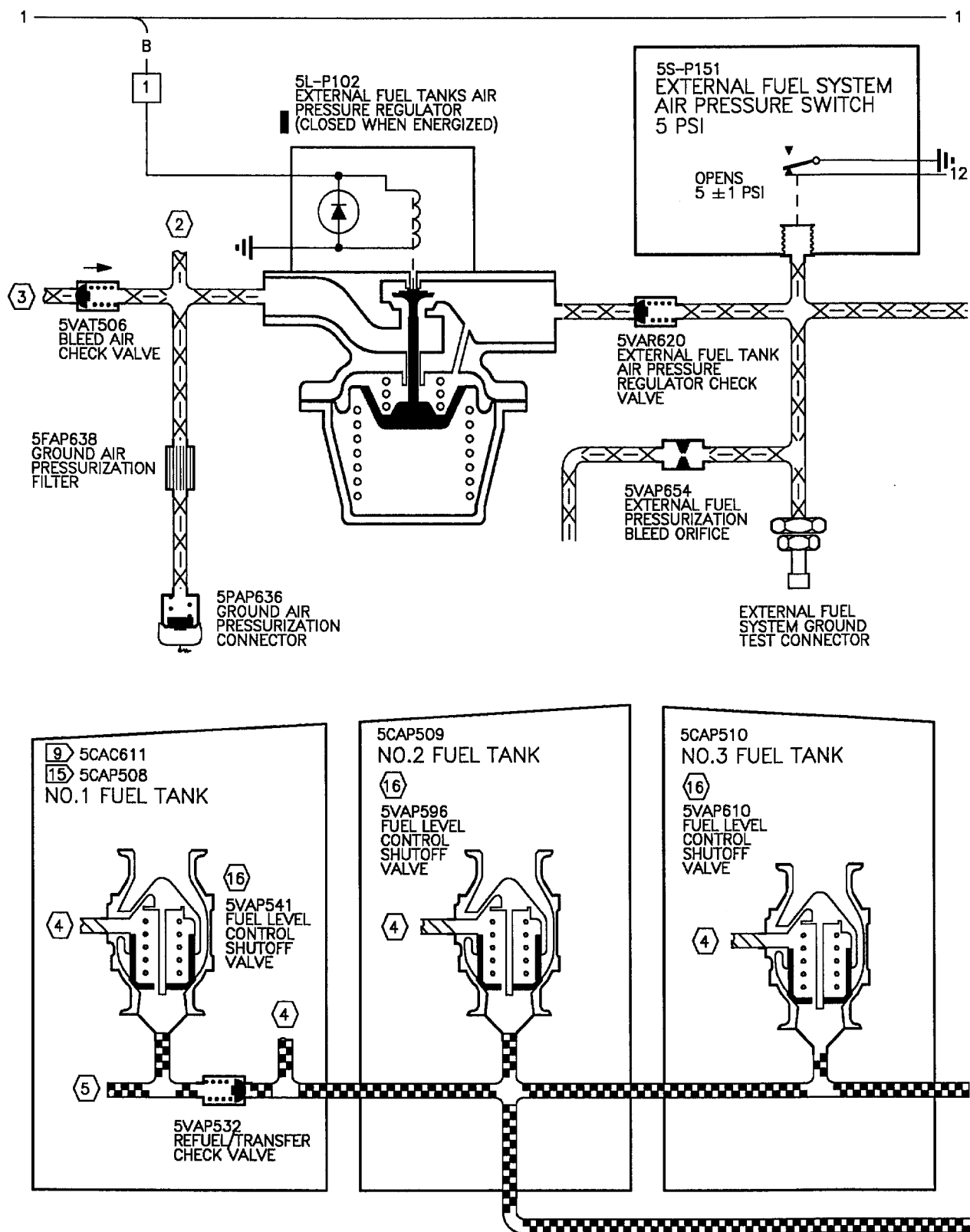
Figure 1. External Fuel System Simplified Schematic (Sheet 2)



18AC-460-10-(28-3)23-CATI

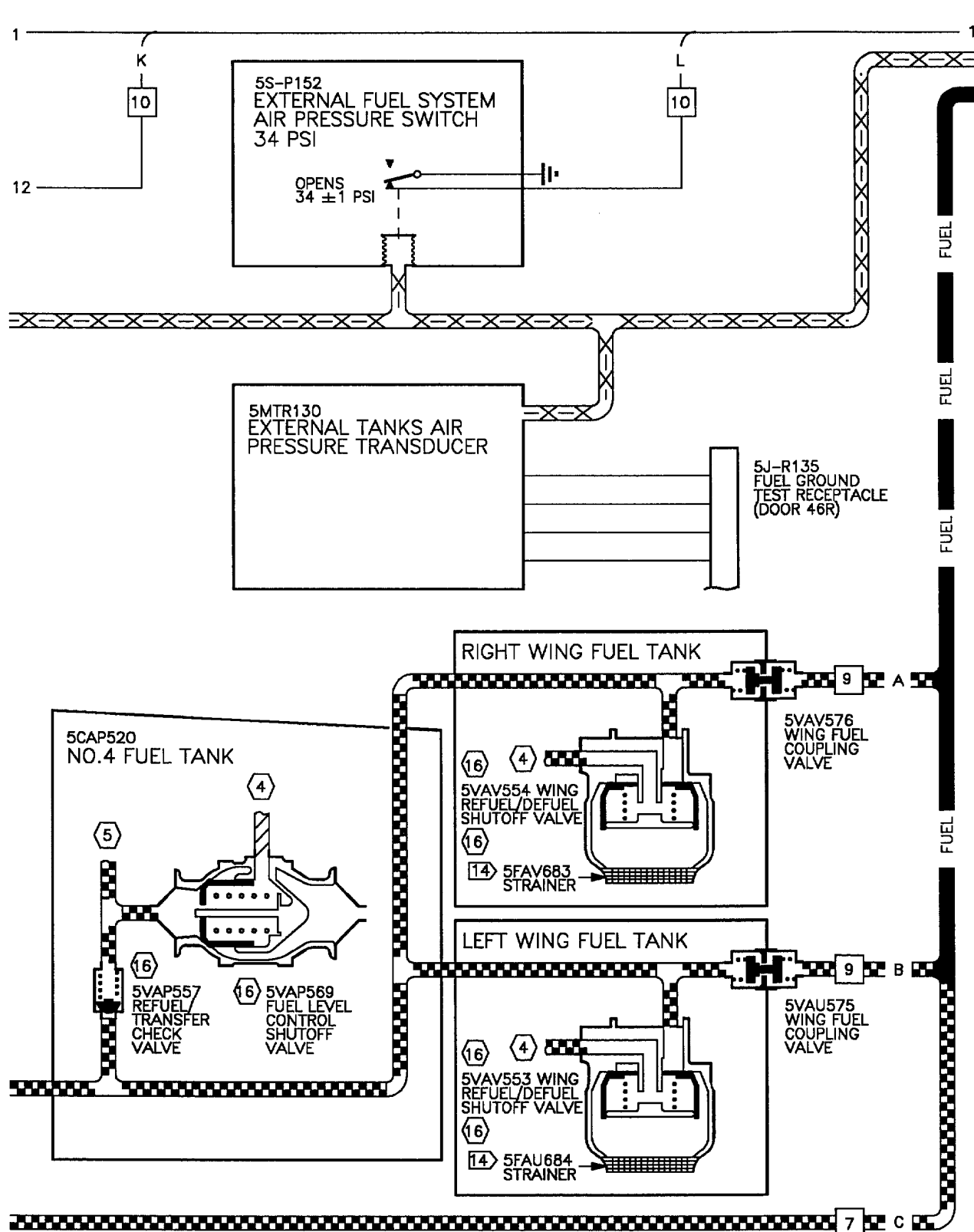
Figure 1. External Fuel System Simplified Schematic (Sheet 3)





18AC-460-10-(28-4)22-CAT1

Figure 1. External Fuel System Simplified Schematic (Sheet 4)



18AC-460-10-(28-5)22-CATI

Figure 1. External Fuel System Simplified Schematic (Sheet 5)



61A-Z506  
AIRCRAFT FUSELAGE CENTERLINE  
PYLON SUU-62/A

5CAY621  
AIRCRAFT FUEL TANK FPU-6/A (ELLIPTICAL)  
(CENTERLINE EXTERNAL TANK SHOWN, RIGHT AND  
LEFT WING TANKS SAME)

5CAY669  
AIRCRAFT FUEL TANK FPU-8/A (CYLINDRICAL)

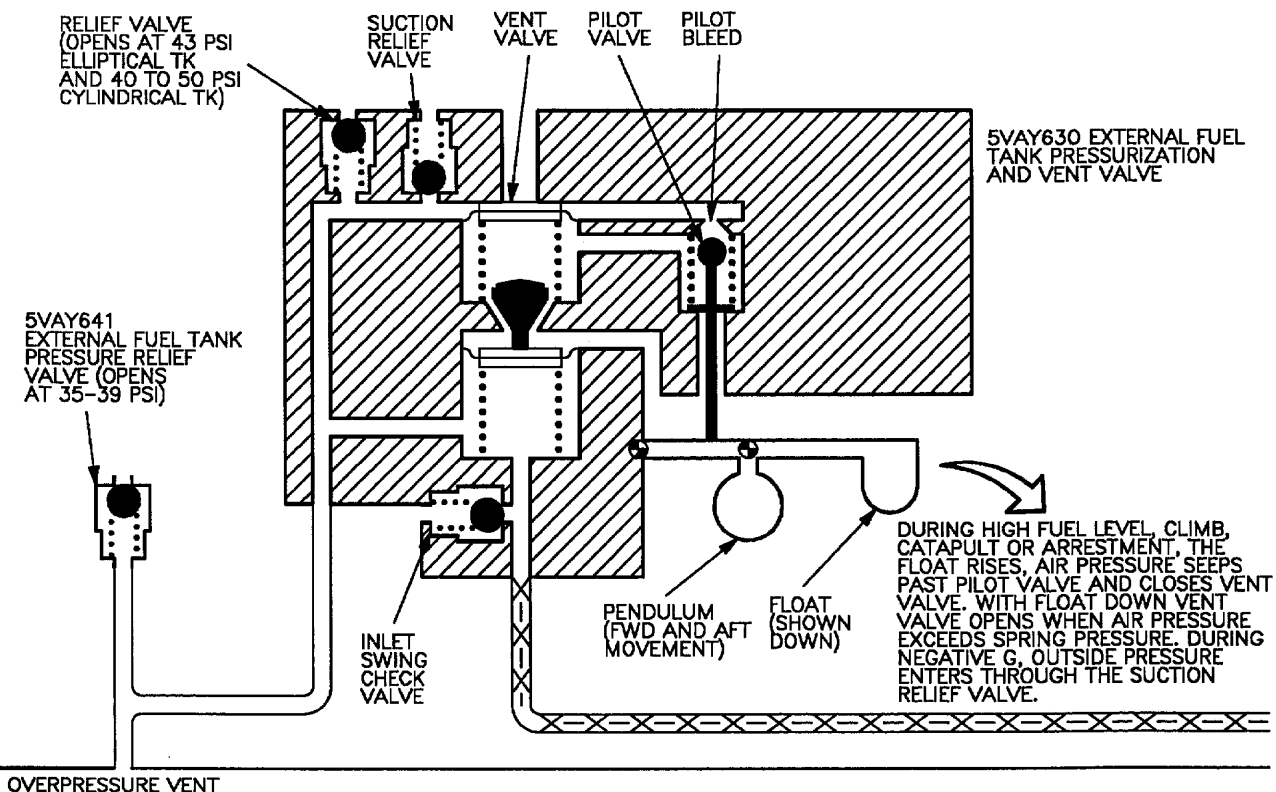


Figure 1. External Fuel System Simplified Schematic (Sheet 6)

18AC-460-10-(28-6)H-CATI

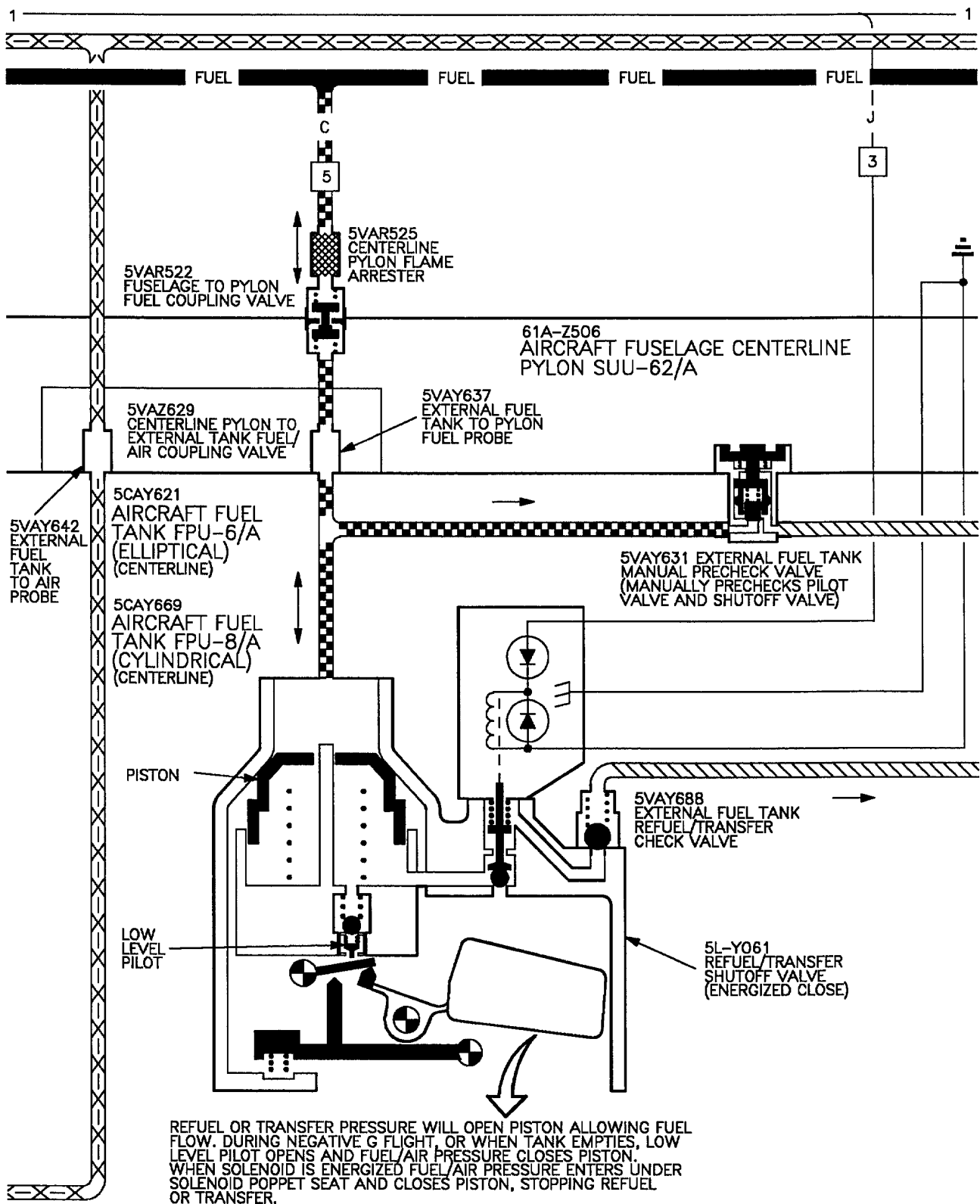
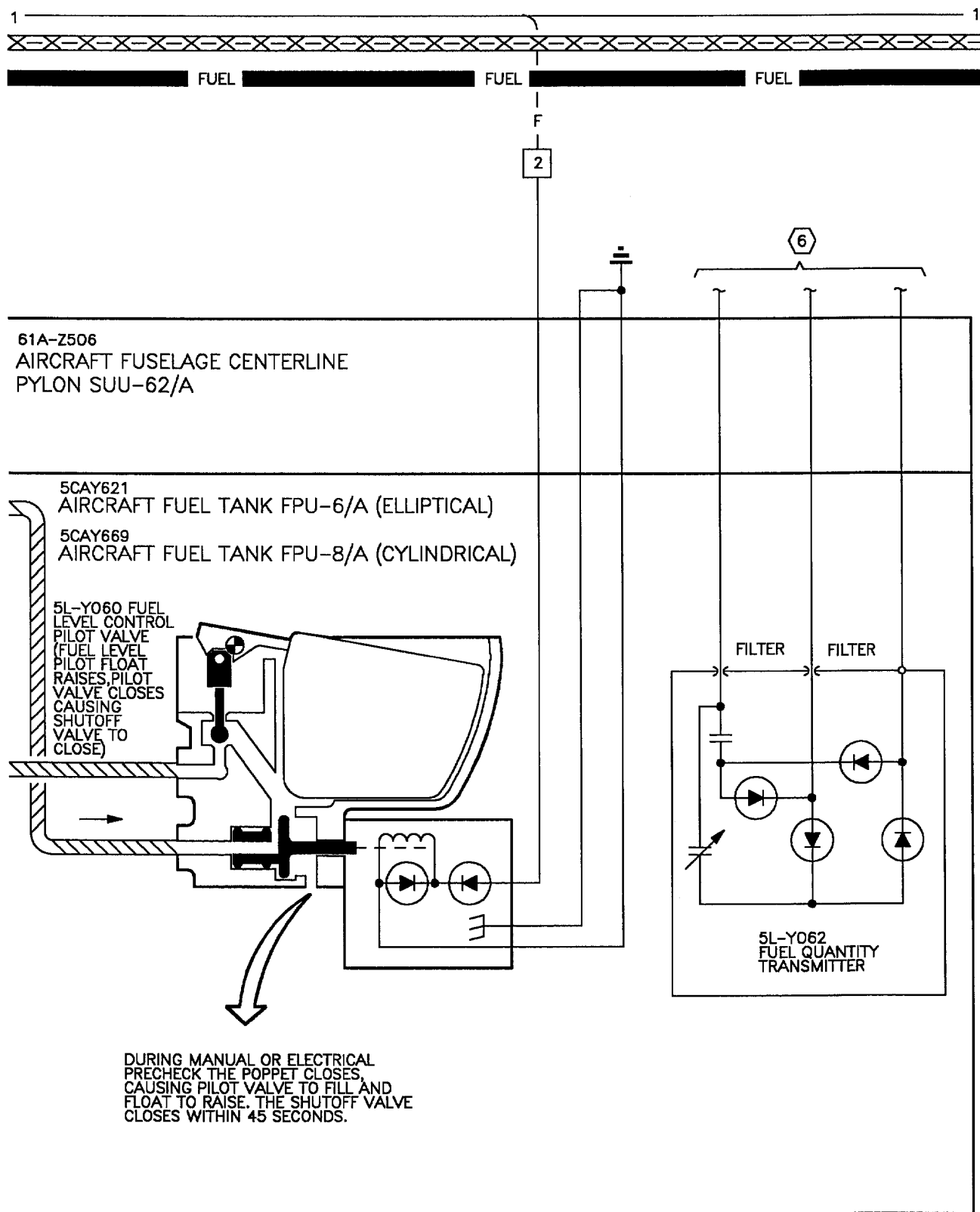


Figure 1. External Fuel System Simplified Schematic (Sheet 7)



18AC-460-10-(28-8)G-CATI

Figure 1. External Fuel System Simplified Schematic (Sheet 8)

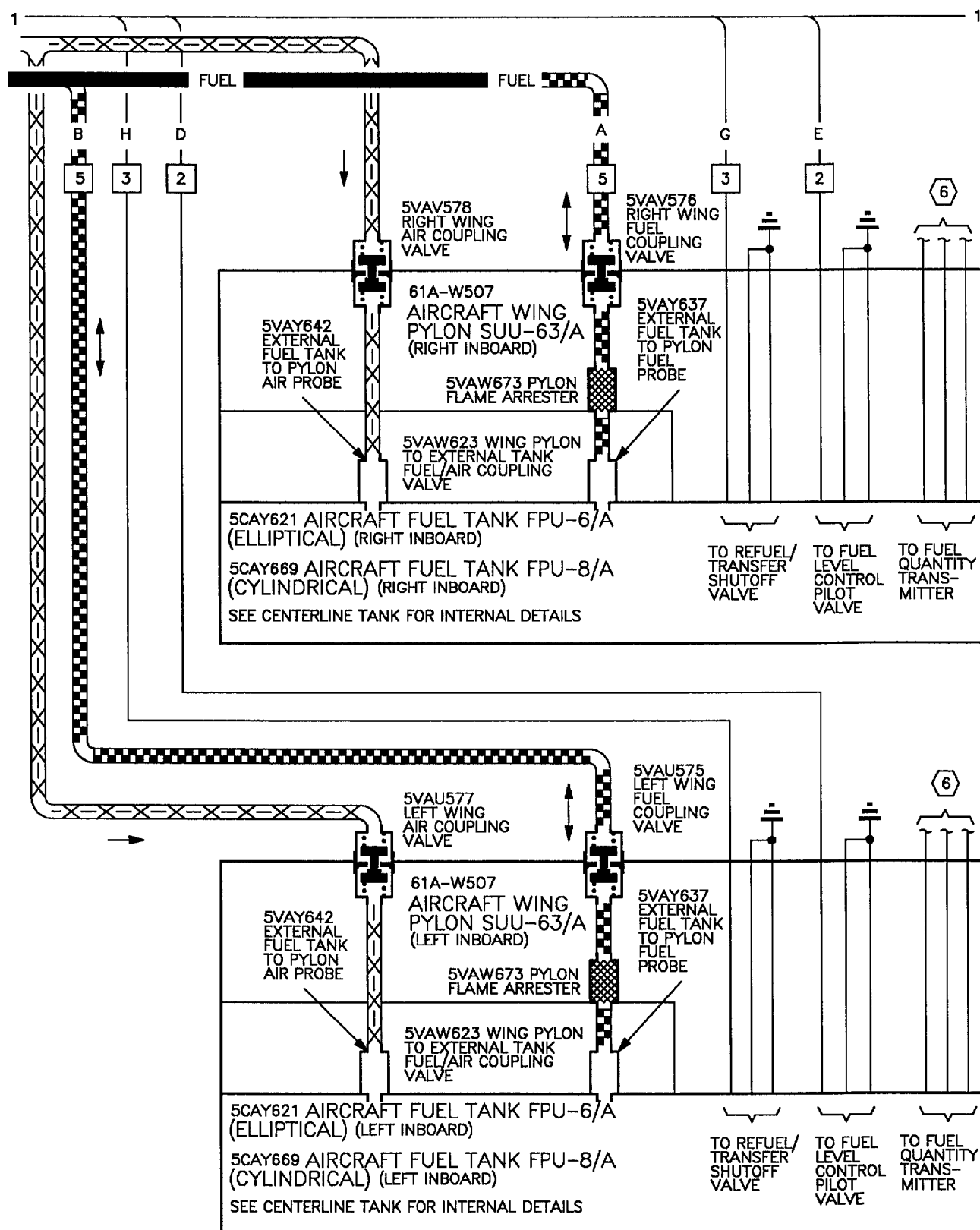


Figure 1. External Fuel System Simplified Schematic (Sheet 9)

18AC-460-10-(28-9)G-CAT1

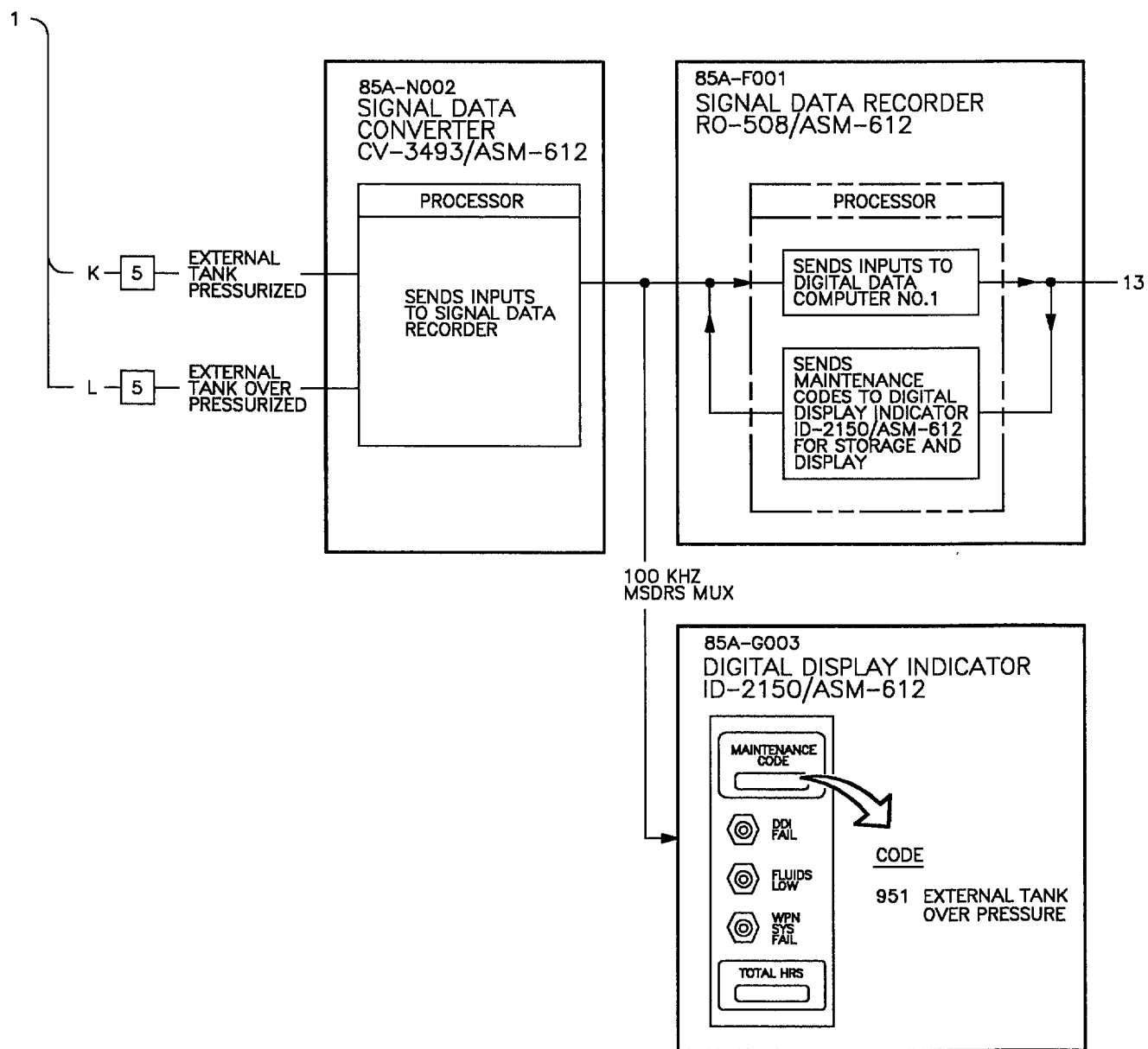
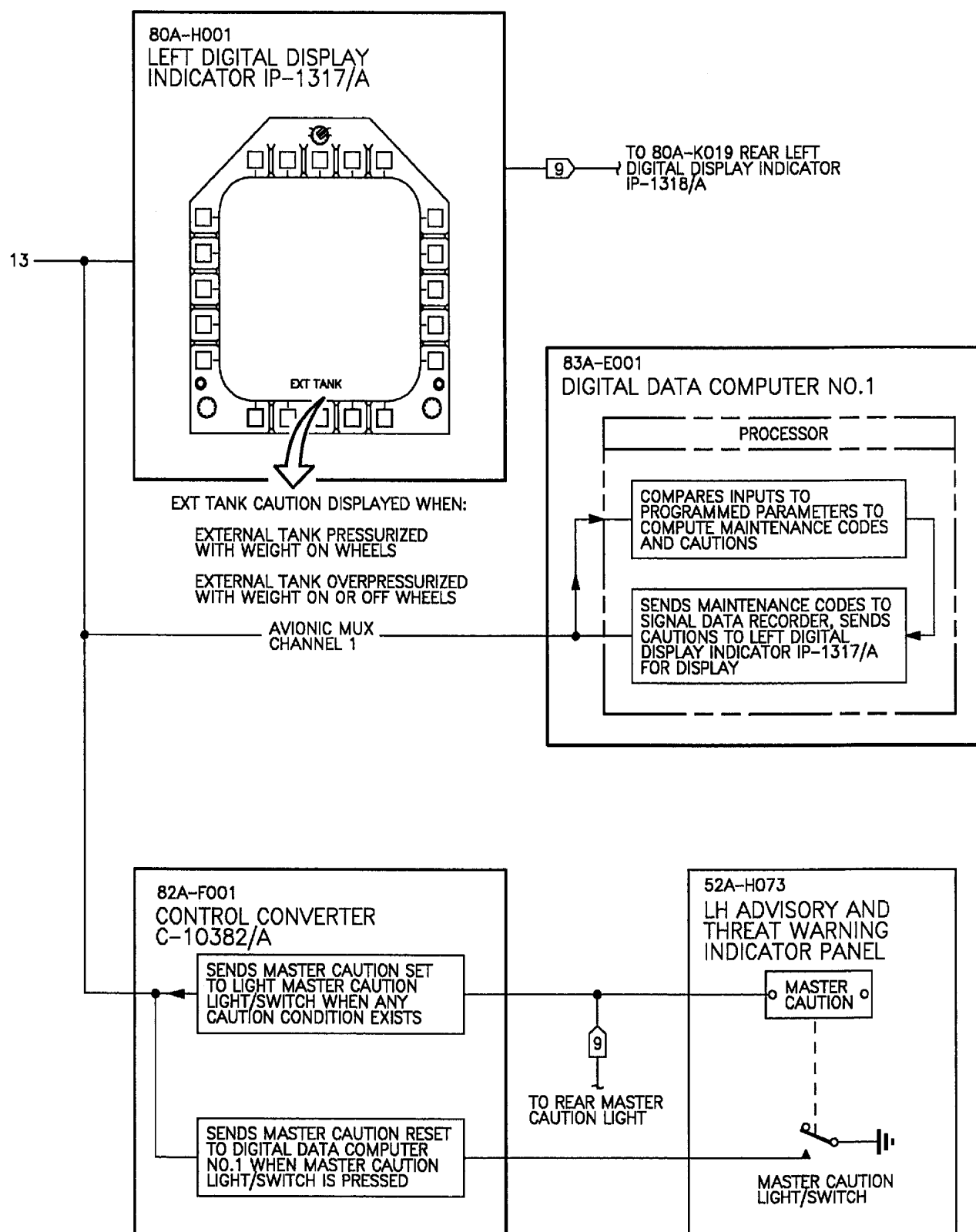


Figure 1. External Fuel System Simplified Schematic (Sheet 10)







18AC-460-10-(28-11)G-CATI

Figure 1. External Fuel System Simplified Schematic (Sheet 11)



## LEGEND

	HIGHWAY FOR MULTIPLE FUEL PATTERNS
	REFUEL
	REGULATED AIR
	REFUEL/TRANSFER

## 1. NONSTANDARD SYMBOLS

















-  TELELIGHT
-  FUEL PRESSURIZATION AND VENT SYSTEM SIMPLIFIED SCHEMATIC, WPO20 00.
  -  AIR CYCLE AIR CONDITIONING SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-410-100, WPO07 00.
  -  REFUEL/DEFUEL SYSTEM SIMPLIFIED SCHEMATIC, WPO07 00.
  -  INTERNAL FUEL TRANSFER SYSTEM SIMPLIFIED SCHEMATIC, WPO14 00.
  -  FUEL QUANTITY GAGING SYSTEM SIMPLIFIED SCHEMATIC, WPO22 00.
  -  INFLIGHT REFUELING SYSTEM SIMPLIFIED SCHEMATIC, WPO08 01.
  -  POWER DISTRIBUTION SIMPLIFIED SCHEMATIC, A1-F18AC-420-100, WPO05 00.
  -  F/A-18B.
  -  161353 THRU 161528 BEFORE F/A-18 AFC 41.
  -  161702 AND UP; ALSO 161353 THRU 161528 AFTER F/A-18 AFC 41.
  -  161353 THRU 161761 BEFORE F/A-18 AFC 39.
  -  161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39.
  -  161735 AND UP.
  -  F/A-18A.
  -  FOR COMPONENT LOCATION, SEE REFUEL/DEFUEL SYSTEM COMPONENT LOCATOR, WPO06 00.

Figure 1. External Fuel System Simplified Schematic (Sheet 12)



## ORGANIZATIONAL MAINTENANCE

## PRINCIPLES OF OPERATION

## DESCRIPTION

## INTERNAL FUEL TRANSFER SYSTEM

## Reference Material

Air Data Computer System .....	A1-F18AC-560-100
Description .....	WP003 00
Fuel System .....	A1-F18AC-460-100
Operation .....	WP003 01
Refuel/Defuel System Description and Operation .....	WP005 00
External Fuel System Description and Operation .....	WP009 00
Internal Fuel Transfer System Operation .....	WP012 01
Internal Fuel Transfer System Component Locator .....	WP013 00
Internal Fuel Transfer System Simplified Schematic .....	WP014 00
Engine Fuel Supply System Description and Operation .....	WP015 00
Fuel Dump System Description and Operation .....	WP017 00
Hot Fuel Recirculation System Description and Operation .....	WP018 00
Fuel Quantity Gaging System Description and Operation .....	WP021 00
Fuel Quantity Low Level Warning Description and Operation .....	WP023 00
Maintenance Status Display and Recording System .....	A1-F18AC-580-100
Operation .....	WP005 00
Mission Computer System .....	A1-F18AC-741-100
Description - System and Component .....	WP003 00
Multipurpose Display Group .....	A1-F18AC-745-100
Description .....	WP003 00

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System Controls and Indicators .....	5
System Description .....	2

## Record of Applicable Technical Directives

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 AFC 53	-	Elimination of Tanks 1 and 4 Sneak Circuit, Tank 4 Motive Flow Shutoff Valve, and Raised Inverted Baffle (ECP MDA-F/A-18-00055)	15 Jun 86	-
F/A-18 AFC 18	-	Incorporation of Fuel Turbine Boost Pump/ Sealing of Raised Baffle in Tanks 2 and 3 (ECP MDA-F/A-18-00077)	15 Jun 86	-
F/A-18 AFC 39	-	No. 1 Fuel Tank Interconnect Valve Replacement and Fuel Sequencing Modification (ECP MDA-F/A-18-00072C1)	1 Nov 86	-

1. **DESCRIPTION.**2. **SYSTEM DESCRIPTION.**

3. **Internal Fuel Transfer System.** The internal fuel transfer system maintains the feed tanks (tanks 2 and 3) full at all engine power settings and controls the sequence of transfer from tank-to-tank.

4. The transfer system consists of various components located in the wings and fuselage which are powered by transfer motive flow and motive flow pressure. This operating pressure is generated by two AMAD mounted pumps.

5. Normal transfer sequence is as follows:

- a. wings transfer to tanks 1 and 4
- b. tanks 1 and 4 transfer to tanks 2 and 3

6. The transfer system contains pressure operated interconnect valves. The interconnect valves open if transfer motive flow and motive flow pressure is lost. When open, the interconnect valves provide a gravity transfer path for fuselage fuel to tanks 2 and 3.

7. **CG Control System - 161520 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 39 AND 53.** The CG control system is part of the internal fuel transfer system. The CG control system controls the aircraft center of gravity by stopping fuel transfer from tank 1 at predetermined fuel quantities. THE CG control system is controlled by the fuel quantity gaging intermediate device (WP021 00).

8. On 161520 THRU 161761 BEFORE F/A-18 AFC 39 AND 53, if fuel quantity is above fuel low level warning (800 + 100 in each feed tank), transfer from tank 1 is stopped when aircraft is in negative G operations. On 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39 and 53, if fuel quantity is above fuel low level warning, transfer from tank 1 and 4 is stopped when aircraft is in negative G operations.

9. **COMPONENT DESCRIPTION.** Internal transfer system components shown in WP013 00 and WP014 00 are described in the paragraphs below. For related component descriptions listed below, refer to applicable WP.

- a. Refuel/defuel shutoff valve (WP005 00)
- b. Scavenge control valve (WP005 00)
- c. Refueling manifold scavenge jet ejector (WP005 00)
- d. Engine fuel boost jet ejector - 161353 THRU 161761 BEFORE F/A-18 AFC 18 (WP015 00)
- e. Engine fuel turbine boost pump - 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 18 (WP015 00)
- f. Hot fuel recirculation check valves (WP018 00)
- g. Fuel diverter valve (WP018 00)

h. Defuel valve (WP005 00)

i. Automatic drain valve (WP005 00)

j. Fuel dump valve (WP017 00)

**10. Refuel/Transfer Check Valve.** The refuel/transfer check valve is a one way flapper valve located in tanks 1 and 4. The check valves prohibit wing transfer fuel from entering tanks 2 and 3. During aircraft defueling (WP005 00), the check valves prevent fuel siphoning through the wing transfer ejectors (this WP).

**11. Fuel Tank No. 1 and 4 High Level Pilot Valves.** The high level pilot valve is a float actuated valve located in tanks 1 and 4. The high level pilot valves control the fuel level control shutoff valves in tanks 1 and 4 (WP003 01) when transferring from the wings.

**12. Fuel Tank No. 1 and 4 Transfer Shutoff Valves.** The transfer shutoff valves are single seat valves located in tanks 1 and 4. When fuel empties from tanks 1 and/or 4 during transfer, the transfer shutoff valve pilot valve closes the transfer shutoff valve, preventing air ingestion into the transfer system. On 161353 THRU 161761 BEFORE F/A-18 AFC 53, during testing and troubleshooting, the shutoff valves can be selectively prechecked to stop transfer (WP003 01).

**13. No. 1 Fuel Tank Transfer Control Valve 161520 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 39.** The transfer control valve is a 28vdc solenoid operated valve. The valve is located between the No. 1 fuel tank transfer shutoff valve and No. 1 fuel tank pilot valve. When energized, the valve is used to stop transfer from tank 1. The valve is controlled by the fuel quantity gaging intermediate device (WP021 00) and air data computer CP-1334/A.

**14. No. 4 Fuel Tank Transfer Control Valve 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 53.** The transfer control valve is a 28vdc solenoid operated valve. The valve is located between the No. 4 fuel tank transfer shutoff valve and No. 4 fuel tank pilot valve. When energized, the valve is used to stop transfer from tank 4. The valve is controlled by the air data computer CP-1334/A.

**15. Fuselage Fuel Tanks Transfer Jet Ejectors.** The transfer jet ejectors are pressure induced (suction) ejectors located in tanks 1 and 4. The ejectors transfer fuel from tanks 1 and 4 to tanks 2 and 3 (WP003 01). The ejectors contain flapper check valves which close when the ejector is not operating. The check valves prevent transfer of fuel between transfer tanks.

**16. No. 1 Fuel Tank Fuel Low Level Shutoff Valve - 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39.** The low level shutoff valve is a 28vdc solenoid operated valve located in tank 1. The shutoff valve controls motive flow pressure to the tank 1 pressure operated interconnect valve (WP012 01). The shutoff valve is controlled by the fuel quantity low level warning system (WP023 00).

**17. Pressure Transducers.** The wing and fuselage pressure transducers receive fuel pressure readings and convert them to electrical signals for ground check-out. The signals are displayed on the fuel system test set pressure indicators.

**18. Pressure Operated Interconnect Valve.** The pressure operated interconnect valves are located in tanks 1, 2, and 3. The interconnect valves provide a gravity flow path for fuel between tanks, if motive flow pressure is lost (WP003 01). On 161520 THRU 161761 BEFORE F/A-18 AFC 39, in tanks 2 and 3, and on 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39, in tanks 1, 2, and 3, the flapper positions of the interconnect valves can be checked using the fuel check panel in door 8 (this WP).

**19. Gravity Feed Check Valves.** The gravity feed check valves in tanks 2 and 3 operate as free swinging flapper valves. The flapper allows fuel to flow to the feed tanks and prevents fuel flow in the opposite direction.

**20. Fuel Level Sensor.** The fuel level sensors are located in tanks 2 and 3. The sensors control the open/close cycles of tanks 2 and 3 transfer shutoff valves to maintain full feed tanks at all engine power setting (WP003 01).

**21. Fuel Tank No. 2 and 3 Transfer Shutoff Valves.** The transfer shutoff valve is a single seat valve mounted in the transfer line of tanks 2 and 3. The valves control fuel transfer into tanks 2 and 3. Opening and closing of the valve is controlled by the fuel level sensor (WP003 01).

**22. Fuel Tank Inverted Flight Check**

**Valves.** The inverted flight check valves are one way flapper valves located on tanks 2 and 3 inverted flight baffles (this WP). The check valves allow fuel to flow from top of the baffle to below the baffle in normal operating conditions. During negative G or inverted flight, the check valves close, trapping fuel below the baffle for engine operation.

**23. Fuel Tank Wash Filter.** The wash filters are line mounted and located in fuel feed tanks 2 and 3. The wash filters trap foreign material and prevent it from entering the engine fuel boost pump or ejector, pressure operated interconnect valves and fuel level sensors.

**24. Motive Flow/Boost Pump.** The motive flow/boost pump is a two stage, single shaft centrifugal pump mounted on the left and right AMAD. The low pressure (boost) stage supplies fuel for engine operation (WP015 00). The high pressure (motive flow) stage supplies fuel pressure for operation of the engine fuel supply (WP015 00), fuel dump (WP017 00), and internal fuel transfer systems (WP012 01), and provides fuel flow for hot fuel recirculation (WP018 00).

**25. Wing Damage Shutoff Valve.** The wing damage shutoff valve is an electrically controlled, solenoid operated, single seat valve, located in tank 4. The valve is used to stop transfer motive flow pressure to the wing, if wing damage occurs. This stops transfer of fuel from the wings to the fuselage (WP003 01).

**26. Vent Tank Scavenge Jet Ejectors.** The vent tank scavenge jet ejectors are pressure induced ejector pumps, located in tank 4. With transfer motive flow pressure applied, the ejectors continuously scavenge fuel from the vent tank to tanks 2 and 3 (WP003 01).

**27. Engine Motive Flow Check Valve.** The engine motive flow check valves are located in tank 4. The check valves prevent reverse flow of fuel from tanks 2 and 3 to the motive flow/boost pump when the pump is not operating.

**28. Engine Transfer Motive Flow Check**

**Valve.** The left and right engine transfer motive flow check valves are one way flapper valves located in tank 4. The check valves prohibit fuel backflow into tank 2 or 3 during single engine operation. This prevents fuel venting due to feed tank (tank 2 or 3) overfilling.

**29. Wing Motive Flow Shutoff Valves.** The wing motive flow shutoff valve is a single seat poppet valve located in the wings. The shutoff valve controls transfer motive flow pressure going to the wing transfer ejector (This WP).

**30. Wing Transfer Jet Ejector.** The wing transfer jet ejectors are pressure induced (suction) ejector pumps located in the wing tanks. The ejectors are controlled by the wing motive flow shutoff valve (this WP).

**31. Wing Motive Flow Pilot Valves.** The motive flow pilot valve is a float actuated valve located in the wing tanks. The pilot valves control the wing motive flow shutoff valve opening and closing (this WP).

**32. Wing Fuel Gravity Check Valves.** The wing fuel gravity check valves are free swinging flapper valves located in tank 4. The check valves allow fuel in the wing to gravity transfer to tank 4 with a 5° roll of the aircraft. The flapper closes to prevent fuel transfer from tank 4 to the wings.

**33. Wing Tank Fuel System Strainer - 161924 AND UP.** The wing tank fuel system strainer is located over the inlet of the wing transfer ejector. During transfer, the strainer prevents foreign objects from entering fuel system components.

**34. Fuel Transfer Tube Adapter and Strainer 161735 THRU 161761.** The fuel transfer tube adapter and strainer is located downstream of the wing transfer ejector between the wing tank and tank 4. During transfer, the strainer prevents foreign objects from entering fuel system components.

**35. Vent Tank Scavenge Pump Inlet Screen.** The scavenge pump inlet screen traps foreign material and prevents it from flowing from the vent tank to the vent tank scavenge jet ejectors in tank 4.

**36. Vent Tank Scavenge Check Valves.** The scavenge check valves prevent fuel from draining through the scavenge lines into the vent tank.

**37. No. 2 and No. 3 Fuel Tank Inverted Flight Baffle Assembly - 161353 THRU 161715, BEFORE F/A-18 AFC 18.** Tanks 2 and 3 are internally divided by horizontal inverted baffles which contain

inverted flight check valves (this WP). The baffles provide captive fuel for engine fuel supply system (WP015 00) during negative G or inverted flight.

**38. No. 2 and No. 3 Fuel Tank Inverted Flight Baffle Assembly - 161716 AND UP; ALSO 161353 THRU 161715 AFTER F/A-18 AFC**

**18.** Tanks 2 and 3 are internally divided by horizontal inverted flight baffles that have raised center sections. Inverted flight check valves are mounted on the baffles (this WP). The baffles provide captive fuel storage for engine fuel supply system (WP015 00) during negative G or inverted flight.

**39. Fuel Level Control Selector Valve.** With the master precheck handle in door 8 in the UP, PRE-CHECK position the fuel level control selector valve is used to supply refuel and motive flow pressure for ground checkout purposes. On 161353 THRU 161761 BEFORE F/A-18 AFC 53, the selector valve can be used to stop transfer from tank 1 and/or 4.

**40. RELATED SYSTEMS.** Systems related to the internal fuel transfer system are listed below.

**41. Maintenance Status Display And Recording System (MSDRS).** The maintenance status display and recording system receive inputs from the fuel system through the signal data converter and recorder. The MSDRS signal data recorder sends data to the mission computer system for processing. If the mission computer system detects a fuel system failure it sends it to the nose wheelwell Digital Display Indicator ID-2150/ASM-612 for storage and display (A1-F18AC-580-100, WP005 00).

**42. Mission Computer System.** The mission computer system receives fuel system data from the MSDRS. The mission computer system digital data computer no. 1 processes the data to determine when a fuel system failure or caution condition occurs. If a failure occurs, digital data computer no. 1 sends the applicable maintenance code to the MSDRS for storage and display. If a caution condition occurs, digital data computer no. 1 sends the caution message to the multipurpose display group for display (A1-F18AC-741-100, WP003 00).

**43. Multipurpose Display Group.** If the mission computer system detects a fuel system caution condition, it sends the caution message to the multipurpose display group. The left Digital Display Indicator

IP-1317( ) receive and display the caution messages (A1-F18AC-745-100, WP003 00).

**44. Air Data Computer.** The air data computer stops fuel transfer from tanks 1 and 4 during negative G conditions above feed tank low level warning (800  $\pm$ 100 lbs) (A1-F18AC-560-100, WP003 00).

**45. SYSTEM CONTROLS AND INDICATORS.** The internal fuel transfer system controls and indicators are listed below.

**46. Fuel Check Panel.** The FUEL CHECK PANEL in door 8 is used during ground operations. The switch and indicators are listed below:

a. On 161353 THRU 161761 BEFORE F/A-18 AFC 39;

TK INTCON V CHK switch  
L EXT FTK CHK switch  
C EXT FTK CHK switch  
R EXT FTK CHK switch  
TK 3V POS indicator light  
TK 2V POS indicator light

b. On 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39;

TK INTCON V CHK switch  
TK 1V POS indicator light  
TK 2V POS indicator light  
TK 3V POS indicator light  
EXT TK PRCHK SW

**47.** For detailed descriptions of EXT TK PRCHK SW - 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39, see WP009 00.

**48.** For detailed descriptions of L/R/C EXT FTK CHK switch - 161353 THRU 161761 BEFORE F/A-18 AFC 39, see WP009 00.

**49. TK INCON V CHK Switch.** On 161353 THRU 161761 BEFORE F/A-18 AFC 39, the TK INCON V CHK switch is used to verify that the flappers of tank 2 and tank 3 pressure operated interconnect valves are closed. On 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39, the TK INTCON V CHK switch is used to verify that the flappers of tank 1, tank 2 and tank 3 pressure operated interconnect valves are closed (WP003 01).

50. **TK 2V/TK 3V POS Indicator Lights.** When the TK INTCON V CHK switch is set, the TK 2V/3V POS indicator light shows green if applicable flapper on interconnect valve is closed.

51. **TK 1V POS Indicator Light - 161924 AND UP; ALSO 161353 THRU 161671 AFTER F/A-18 AFC 39.** When the TK INCON V CHK switch is set, the TK 1V POS indicator light shows green if flapper of the interconnect valve is closed (WP003 01).

52. **Exterior Lights (EXT LT) control Panel.** The INTR WING switch is located on the EXT LT control panel. When this switch is set to INHIBIT, the below occurs:

a. wing damage shutoff valve is energized closed, stopping wing transfer (this WP).

b. wing refuel lockout valve energizes open to prevent wing refueling (WP005 00).

c. wing diverter valves deenergize and directs fuel to the feed tanks (WP018 00).

53. **Digital Display Indicator IP-1317( ), IP-1318( ).** On 161520 AND UP, a CG caution display will appear on left Digital Display Indicator IP-1317( ) in the cockpit and on F/A-18B, left Digital Display Indicator IP-1318( ) in the rear cockpit. The CG caution circuit in the fuel quantity gaging intermediate device monitors the ratio of tank 1 to tank 4 fuel amounts. If these set amounts are exceeded, a CG caution is displayed.

54. **MASTER CAUTION Light.** The MASTER CAUTION light is on the LH advisory and threat warning indicator panel. The yellow caution light indicates a fuel system malfunction requiring attention but no immediate action.

55. **Digital Display Indicator ID-2150/ASM-612.** The Digital Display Indicator ID-2150/ASM-612 in the nose wheelwell stores and displays fuel transfer system maintenance failure codes.



## ORGANIZATIONAL MAINTENANCE

## PRINCIPLES OF OPERATION

## OPERATION

## INTERNAL FUEL TRANSFER SYSTEM

This WP supersedes WP012 01 dated, 15 January 1992.

## Reference Material

Fuel System .....	A1-F18AC-460-100
Operation .....	WP003 01
Internal Fuel Transfer System Description .....	WP012 00
Engine Fuel Supply System Description and Operation .....	WP015 00
Fuel Dump System Description and Operation .....	WP017 00
Hot Fuel Recirculation System Description and Operation .....	WP018 00
Internal Fuel Transfer System Component Locator .....	WP013 00
Internal Fuel Transfer System Component Schematic .....	WP014 00
Refuel/Defuel System Description and Operation .....	WP015 00

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## Record of Applicable Technical Directives

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 AFC 53	-	Elimination of Tanks 1 and 4 Sneak Circuit, Tank 4 Motive Flow Shutoff Valve, and Raised Inverted Baffle (ECP-MDA-F/A-18-00055)	15 Jun 86	-
F/A-18 AFC 39	-	No. 1 Fuel Tank Interconnect Valve Replace- ment and Fuel Sequencing Modification (ECP- MDA-F/A-18-00072C1)	1 Nov 86	-

## 1. OPERATION.

a. Fuel tank no. 1 and 4 transfer pilot valves.

2. **COMPONENT OPERATION.** Detailed operational descriptions are given in WP003 01 for components listed below:

b. Fuel tank no. 1 and 4 transfer shutoff valves.

c. No. 1 fuel tank transfer control valve 161520 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 39.

d. No. 4 fuel tank transfer control valve 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 53.

e. Fuselage fuel tanks transfer jet ejector.

f. No. 1 fuel tank fuel low level shutoff valve 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39.

g. Pressure operated interconnect valve.

h. Fuel level sensor.

i. Fuel tank no. 2 and 3 transfer shutoff valves.

j. Wing damage shutoff valve.

**3. No. 1 Fuel Tank Fuel Low Level Shutoff Valve 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39.** When energized by 28vdc the normally open shutoff valve closes. When the shutoff valve closes, motive flow pressure is removed from the tank 1 pressure operated interconnect valve. This allows the interconnect valve flapper to open and provide a gravity transfer path to tank 2.

**4. Motive Flow/Boost Pump.** The motive flow/boost pump is driven by the AMAD. The first stage supplies fuel to the engine inlet at approximately 20 to 53psi (engine fuel supply system, WP015 00). The second stage increases fuel pressure to approximately 45 to 138psi and is supplied to components in the internal fuel transfer system (this WP), fuel dump system (WP017 00), and engine fuel supply system (WP015 00). High pressure (motive flow) also provides fuel flow for the hot fuel recirculation system (WP018 00).

**5. Vent Tank Scavenge Jet Ejector.** The vent tank scavenge jet ejectors are operated by transfer motive flow pressure. Transfer motive flow pressure creates an induced flow (suction) within the ejectors. Vent tank fuel is drawn by suction and mixed with transfer motive flow pressure, then delivered to tanks 2 and 3.

**6. Wing Motive Flow Float Pilot Valve.** When wing tank fuel level is above the wing motive flow

pilot valve, transfer motive flow pressure is relieved into the tank. As the wing tank empties, the pilot valve float drops, closing the relief port and generating a pressure signal. The pressure signal closes the wing motive flow shutoff valve (this WP).

**7. Wing Motive Flow Shutoff Valve.** When wing tank fuel quantity is above the motive flow pilot valve (this WP), transfer motive flow pressure opens the wing motive flow shutoff valve. Transfer motive flow pressure flows through the open shutoff valve to the wing transfer ejector. As the wing tank empties, transfer motive flow pressure no longer relieves to the pilot valve. The shutoff valve closes, stopping transfer motive flow to the ejector.

**8. Wing Transfer Jet Ejector.** Transfer motive flow pressure from the wing motive flow shutoff valve (this WP) creates an induced (suction) flow within the ejector. Wing tank fuel is drawn through the bottom of the ejector, opening the flapper check valve and is mixed with transfer motive flow pressure. The mixed fuel is then delivered to tanks 1 and/or 4. When the tank empties or transfer motive flow pressure is lost, the flapper check valve closes to prevent reverse flow.

**9. SYSTEM OPERATION.** A component locator in WP013 00 and simplified schematic in WP014 00 shows internal fuel transfer system interface.

**10.** The internal fuel transfer system is powered by motive flow pressure, generated by two AMAD mounted motive flow/boost pumps and contained in a closed loop circuit.

**11. Transfer Motive Flow.** Flow pressure passing through the left and right engine motive flow check valves (WP012 00) is combined to create transfer motive flow pressure. Transfer motive flow pressure operates the wing transfer ejectors (this WP) and tanks 1 and 4 transfer jet ejectors (WP003 001) Transfer motive flow pressure also closes the refuel/defuel shutoff valve (WP003 01) and defuel valve (WP003 01).

**12. Wing Transfer.** Wing transfer starts when the fuel level depletes below the high level pilot valves in tanks 1 and/or 4. This opens the fuel level control shutoff valve, allowing the wing transfer jet ejectors to transfer fuel through the refuel/transfer manifold. As the fuel level in the wings depletes below the transfer motive flow pilot valves, the wing transfer motive flow shutoff valves close stopping transfer from the wings. Refuel/transfer check

valves (WP012 00) in tanks 1 and 4 keep fuel from entering the refuel line and the feed tanks.

13. As fuel from the hot fuel recirculation system (WP018 00) increases wing fuel, the wing motive flow pilot valve and motive flow shutoff valve open, allowing wing transfer. Transfer from one wing to the other is prevented by a flapper check valve at the inlet of each wing ejector.

14. Transfer motive flow pressure to each wing ejector is controlled by the normally open wing damage shutoff valve in tank 4. If wing damage occurs, the pilot sets the INTR WING switch to INHIBIT on the cockpit EXT LT control panel. This closes the wing damage shutoff valve preventing loss of fuel through a wing transfer motive flow line and stopping wing transfer.

15. If normal wing transfer does not occur, all wing fuel can be gravity transferred to tank 4 with 5° of roll. A check valve in each gravity transfer line prevents reverse flow.

16. **Fuselage Transfer.** Fuselage transfer (transfer from tanks 1 and 4 to tanks 2 and 3) starts when the fuel level sensors open the transfer shutoff valves in tanks 2 and 3 (WP003 01).

17. Fuel flow (transfer) from tanks 1 and 4 transfer jet ejectors enter a fuselage transfer manifold that supplies fuel to a transfer shutoff valve in each feed tank (tanks 2 and 3), and to the dump valve. Transfer from tank 1 or 4 ejector alone is enough to keep both the feed tanks full at maximum engine demand.

18. When a transfer tank is empty, transfer pilot valve and transfer shutoff valve close preventing transfer motive flow pressure from entering the transfer line. Fuel transfer between fuselage transfer tanks is prevented by check valves in the inlets of each transfer jet ejector.

19. Fuel levels in the feed tanks are maintained by a fuel level sensor and transfer shutoff valve within each feed tank (WP003 01).

20. If transfer from tanks 1 and 4 to the feed tanks fails, fuel gravity transfers through an always open interconnecting line in the bottom of tank 4 and through an orifice in the interconnect valve in tank 1.

21. If motive flow pressure to either engine fuel boost jet ejector or engine fuel turbine boost pump is interrupted, tanks 2 and 3 fuel gravity feed through the ejector to the engine.

22. If the left engine shuts down and/or left motive flow boost pressure is lost, the tank 1 and tank 2 pressure operated interconnect valves open. This allows fuel to gravity feed from tanks 1 and 2 to tank 3. Reverse flow from tank 3 is prevented by a flapper check valve on tank 3 interconnect valve.

23. If the right engine is shut down and/or right motive flow boost pressure is lost, the tank 3 pressure operated interconnect valve opens. Tank 4 interconnect line is always open. Fuel gravity feeds from tanks 3 and 4 to tank 2. Reverse flow is prevented by the flapper check valve on tank 2 interconnect valve and tank 3 flapper check valve.

24. On 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39, motive flow pressure to the tank 1 fuel low level shutoff valve and pressure operated interconnect valve controls gravity feed to tank 2. The fuel low level shutoff valve is energized closed when fuel in tank no. 2 is below 700 to 900 lbs. The closed fuel low level shutoff valve stops motive flow fuel to the pressure operated interconnect valve allowing the flapper to swing open. Once the flapper is open, fuel in tank 1 can gravity feed to tank 2.

25. The positions of the tank 2 and 3 pressure operated interconnect valves are tested using the fuel check panel in door 8. On 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39, tank 1 pressure operated check valve is also tested using the fuel check panel in door 8.

26. **Built-In Test (BIT).** The fuselage fuel tanks are continuously monitored inflight for normal operation (normal depletion)). The normal sequence of depletion is: wing tanks, tank 1, tank 4, tank 3, then tank 2.

27. The signal data recording set is continuously supplied fuel quantity data from the fuel quantity gaging intermediate device. The signal data recording set sends fuel quantity consumption readings to the digital data computer no. 1. Digital data computer no. 1 compares programmed parameters of fuel consumption to the supplied fuel quantity readings. If a fuel quantity consumption reading is out of sequence, the digital data computer no. 1 commands the maintenance status display and recording system to store and display fuel system maintenance codes.

28. **Fuel Scavenge.** Fuel scavenge provides a method to remove fuel from the refuel/defuel line and vent tank.

29. The refueling manifold scavenge jet ejector in tank 2 continuously scavenges the refuel/defuel line forward of tank 1 (WP005 00).

30. Motive flow pressure is routed to vent tank scavenge ejectors in tank 4. The right ejector routes scavenge motive flow pressure to tank 3. The left ejector routes scavenge motive flow pressure to tank 2. The combined flow rate of both ejectors is enough to empty a full vent tank between engine start and catapult launch.

31. **CG Control System - 161520 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 39 AND 53.** The fuel quantity gaging intermediate device continuously compares the ratio of fuel between tanks 1 and 4. When tank 1 depletes fuel at a faster rate than tank 4, the transfer control valve in tank 1 is energized closed stopping transfer from tank 1. Tank 1 will not resume transfer until tank 4 transfers (depletes) fuel to within the parameters defined by the intermediate devices. If fuel distribution in tanks 1 and 4 has caused the aircraft center of gravity to be further aft than desired, a CG caution will display on the left digital display indicator.

32. Once tank 4 depletes below 150 pounds of fuel, the intermediate device will stop monitoring tank 1 and 4 fuel ratios. Tank 1 will then transfer fuel until the transfer pilot valve closes the shutoff valve.

33. On 161520 THRU 161761 BEFORE F/A-18 AFC 39 AND 53, with fuel quantity above low level warning and aircraft in negative G operation, the transfer control valve is energized closed, stopping transfer from tank 1.

34. On 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39 AND 53, with fuel quantity above low level warning and aircraft in negative G operation, the transfer control valve in tank 4 is also energized closed, stopping transfer from tank 4.

35. **Built-In Test (BIT).** When the FUEL QTY selector is set to BIT, the operating condition of the fuel quantity gaging and fuel low level warning system is tested. A part of the fuel quantity gaging BIT includes a test of the CG system (fuel quantity gaging is used to determine proper CG). If the CG caution is failed in BIT a FUEL advisory will appear instead of the CG caution on left DDI IP-1317( ), IP-1318( ).

36. **Internal Fuel Transfer System Cautions/Codes.** Cautions are displayed on left cockpit DDI IP-1317( ), IP-1318( ) and light the MASTER CAUTION light. Codes are displayed on nose wheelwell DDI ID-2150/ASM-612. Internal fuel transfer system cautions/codes are explained below.

37. CG - 161520 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 39 AND 53. Caution that indicates fuel distribution in transfer tanks 1 and 4 has caused the aircraft center of gravity to be further aft than desired as determined by fuel quantity gaging intermediate device.

38. Code 945. Code that indicates a tank 3 transfer failure. Tank 3 fails to accept fuel.

39. Code 946. Code that indicates a tank 2 transfer failure. Tank 2 fails to accept fuel.

40. Code 947. Code that indicates a tank 4 transfer failure or tank 1 failure to accept fuel.

41. Code 948. Code that indicates a tank 1 transfer failure or tank 4 failure to accept fuel.

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**ORGANIZATIONAL MAINTENANCE**  
**PRINCIPLES OF OPERATION**  
**COMPONENT LOCATOR**  
**INTERNAL FUEL TRANSFER SYSTEM**

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**Reference Material**

None

**Alphabetical Index**

**Subject**

**Page No.**

Internal Fuel Transfer System Component Locator, Figure 1 ..... 2

**Record of Applicable Technical Directives**

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 AFC 53	-	Elimination of Tanks 1 and 4 Sneak Circuit, Tank 4 Motive Flow Shutoff Valve, and Raised Inverted Baffle (ECP-MDA-F/A-18-00055/C1)	15 Jun 86	-
F/A-18 AFC 18	-	Incorporation of Fuel Turbine Boost Pump/ Sealing of Raised Baffle in Fuel Tanks 2 and 3 (ECP-MDA-F/A-18-00077C1/C2)	15 Jun 86	-
F/A-18 AFC 21	-	Addition of Fuel/Air Heat Exchanger (ECP- MDA-F/A-18-00033)	15 Jun 86	-
F/A-18 AFC 39	-	No. 1 Fuel Tank Interconnect Valve Replace- ment and Fuel Sequencing Modification (ECP- MDA-F/A-18-00072C1)	1 Nov 86	-

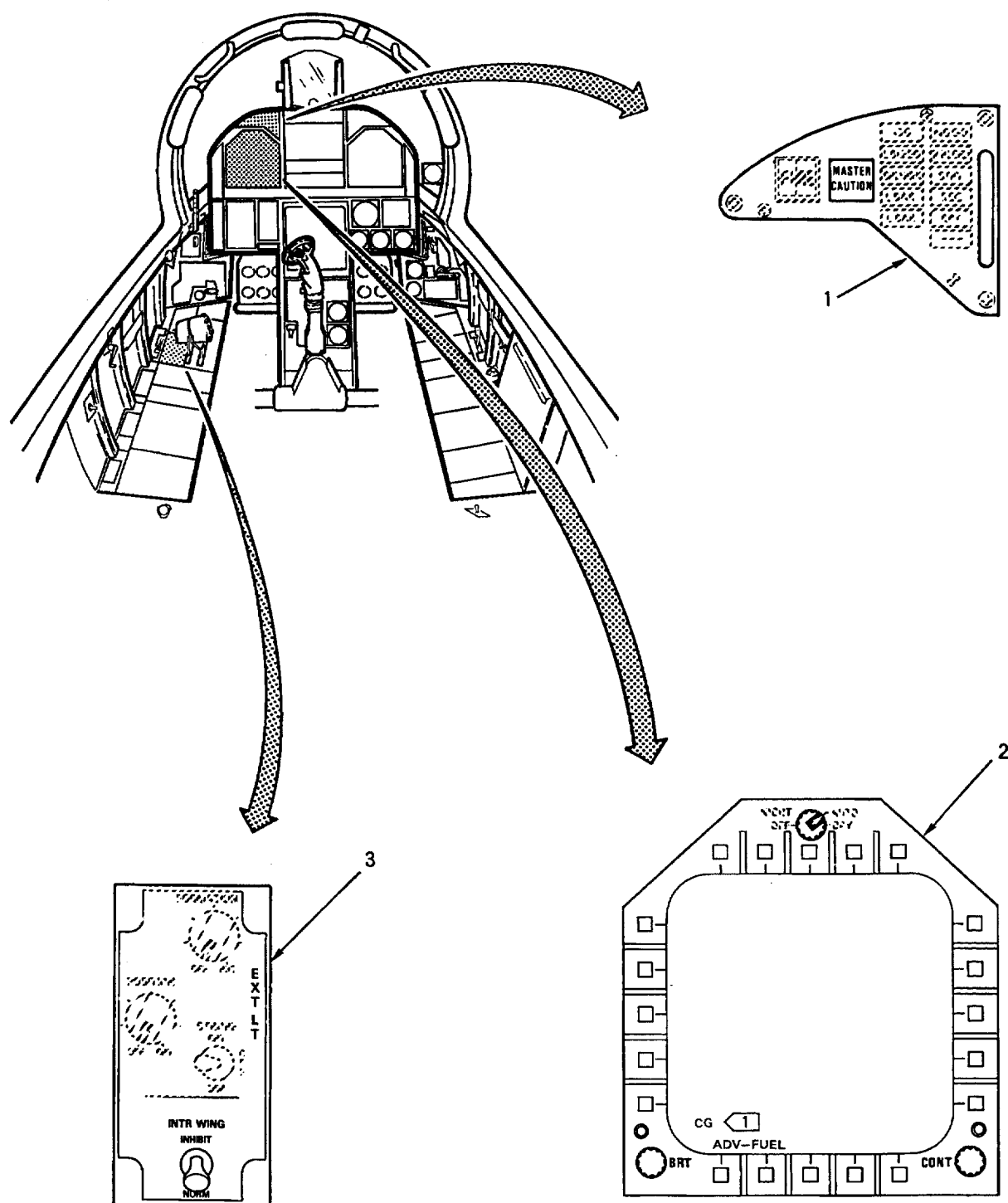
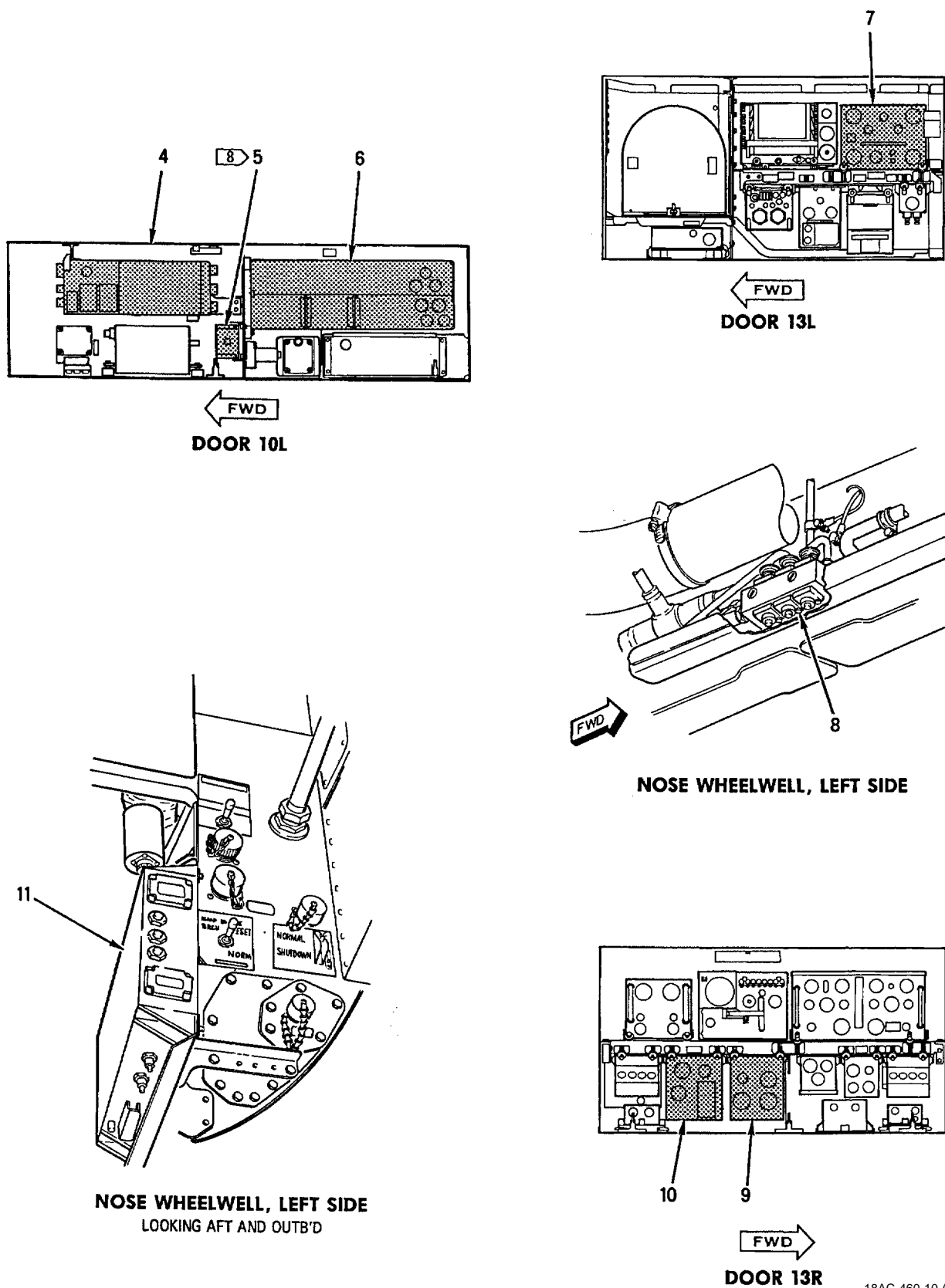


Figure 1. Internal Fuel Transfer System Component Locator (Sheet 1)



18AC-460-10-(6-2)19

Figure 1. Internal Fuel Transfer System Component Locator (Sheet 2)

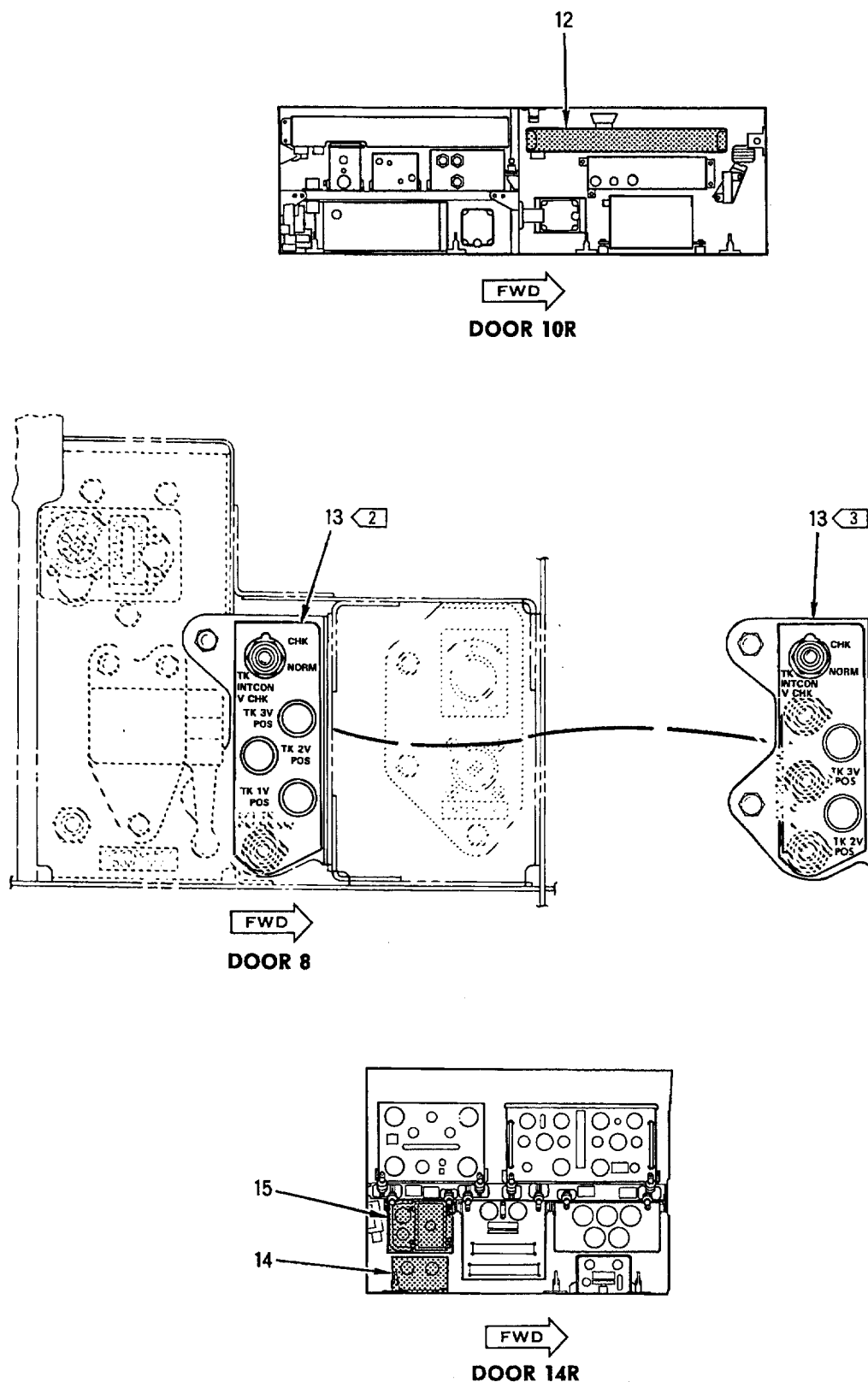


Figure 1. Internal Fuel Transfer System Component Locator (Sheet 3)



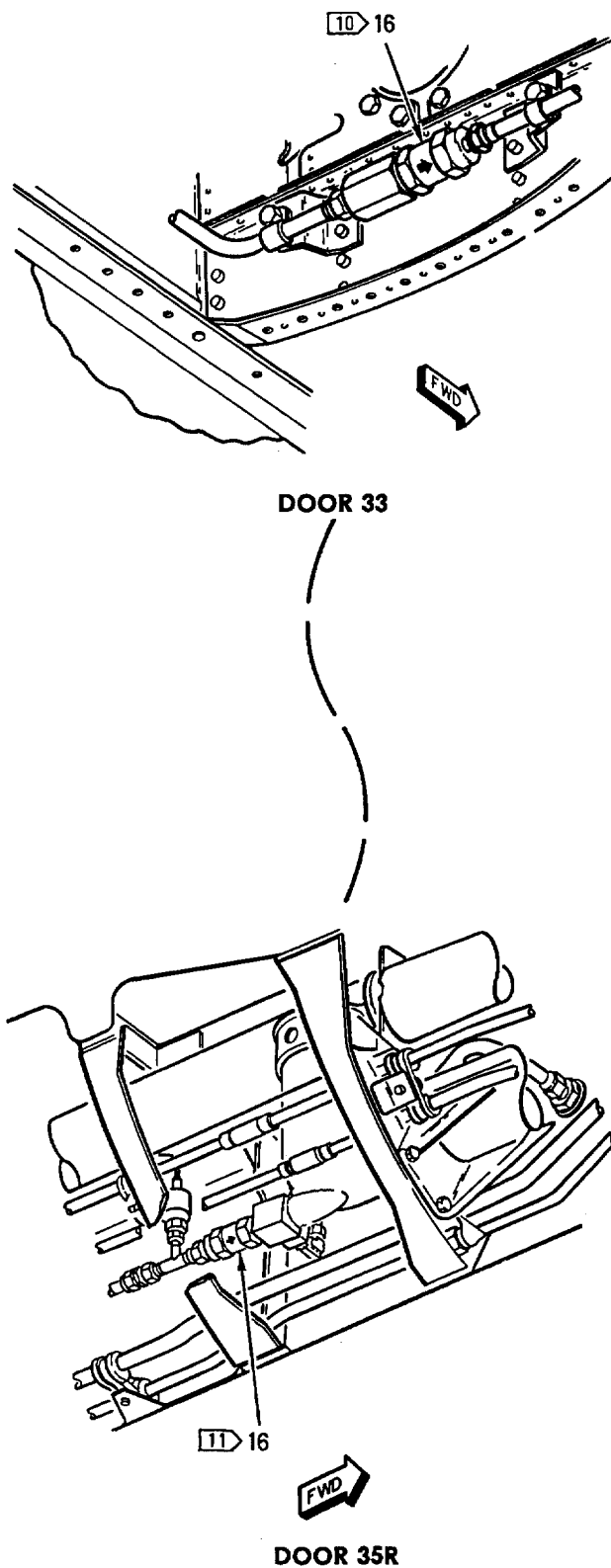


Figure 1. Internal Fuel Transfer System Component Locator (Sheet 4)

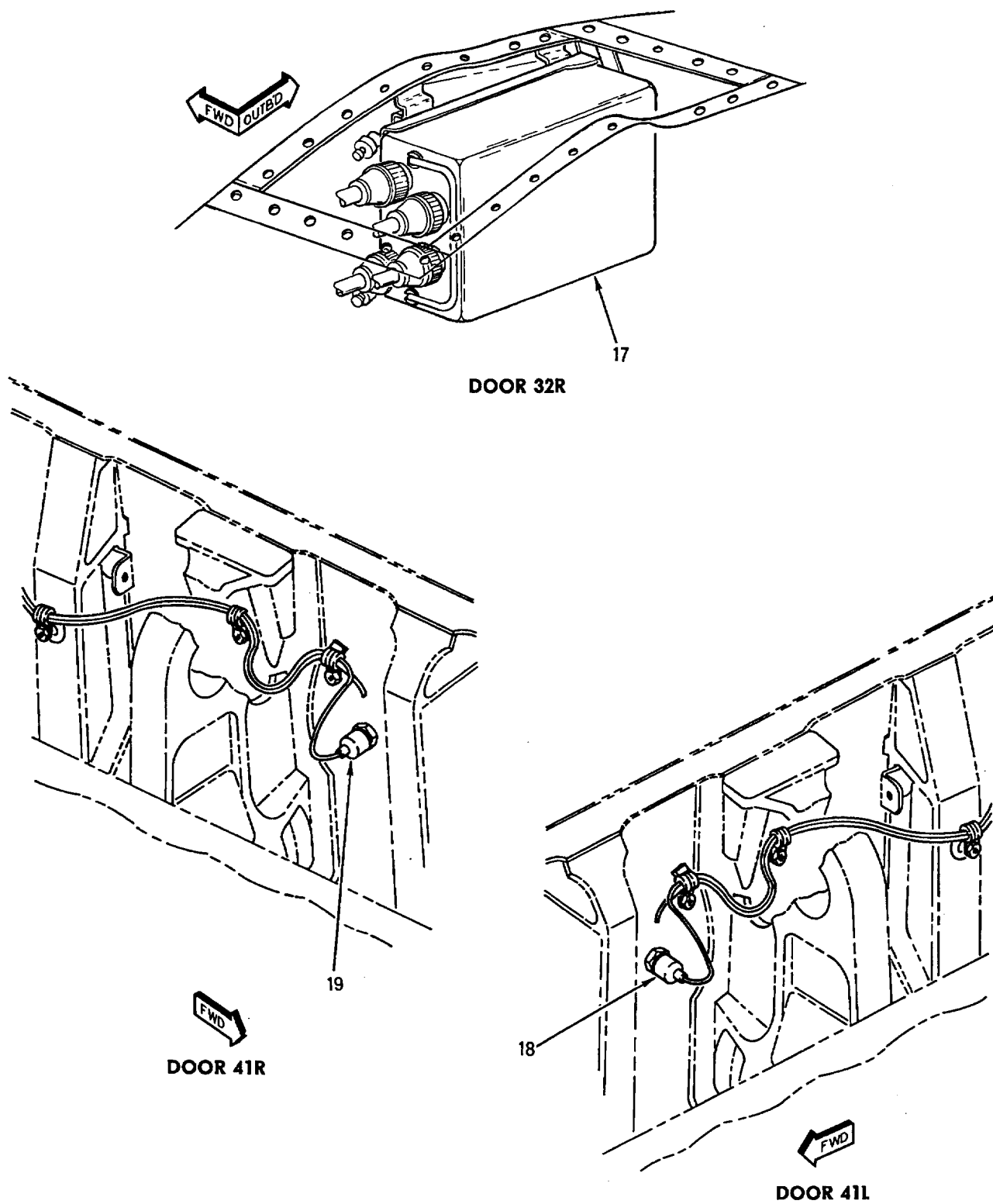
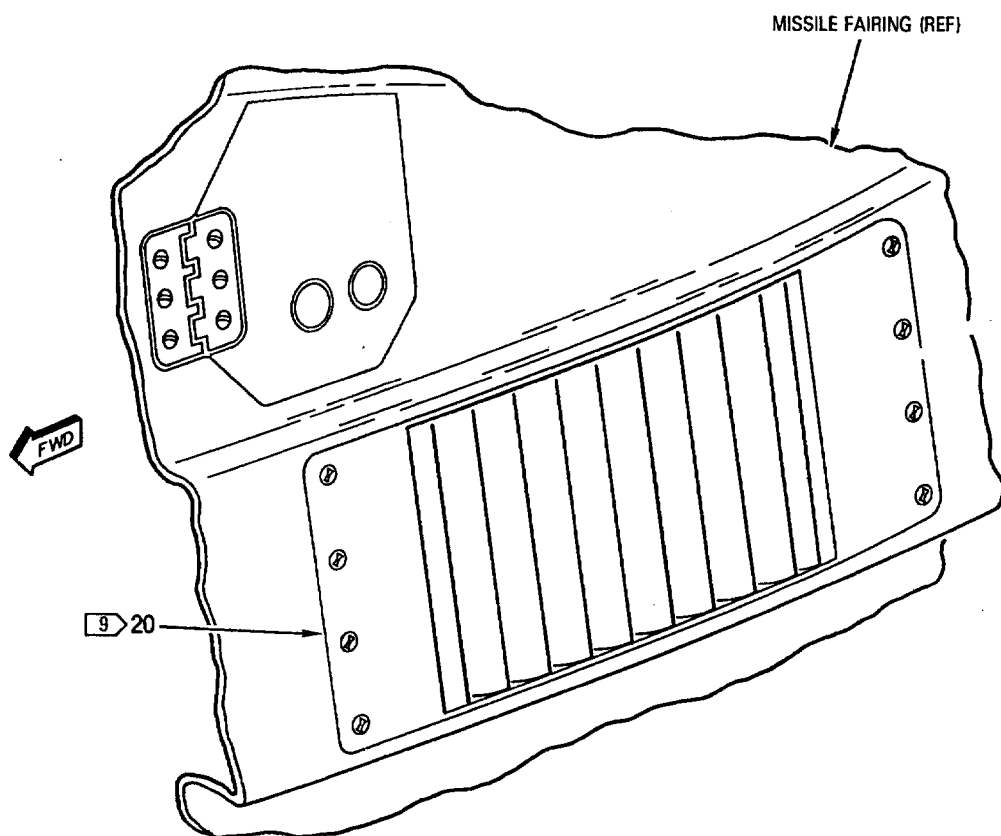
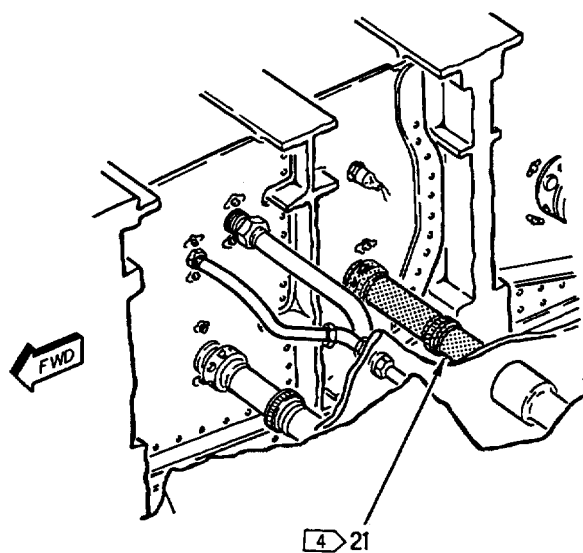


Figure 1. Internal Fuel Transfer System Component Locator (Sheet 5)



**MISSILE FAIRING**  
LEFT SIDE SHOWN,  
RIGHT SIDE OPPOSITE



**DOOR 41L/R**

**Figure 1. Internal Fuel Transfer System Component Locator (Sheet 6)**

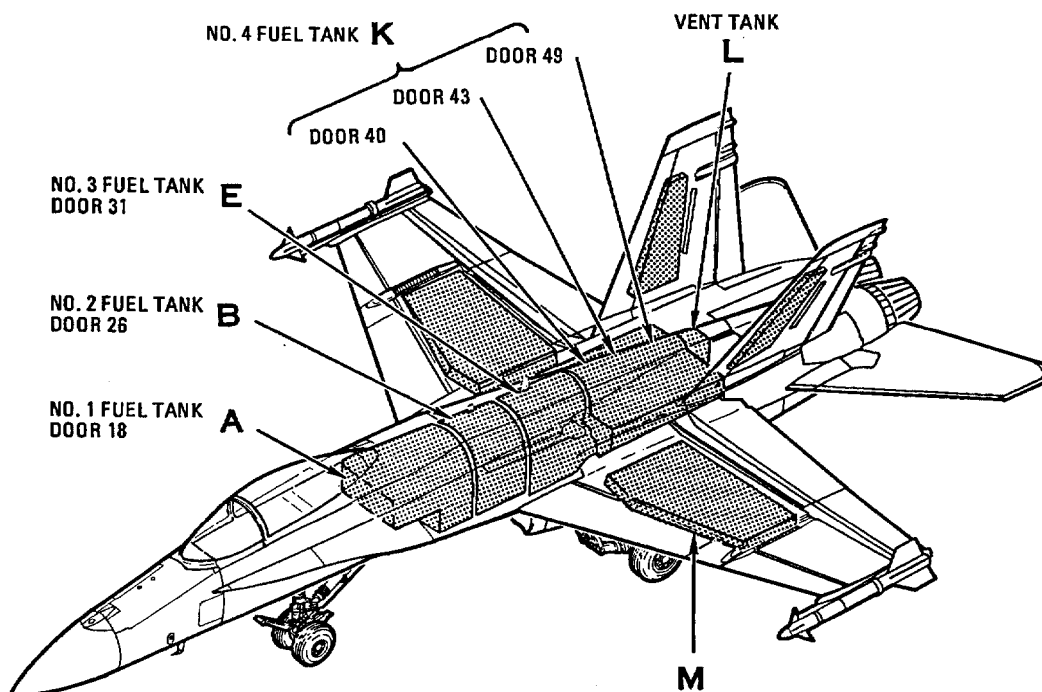
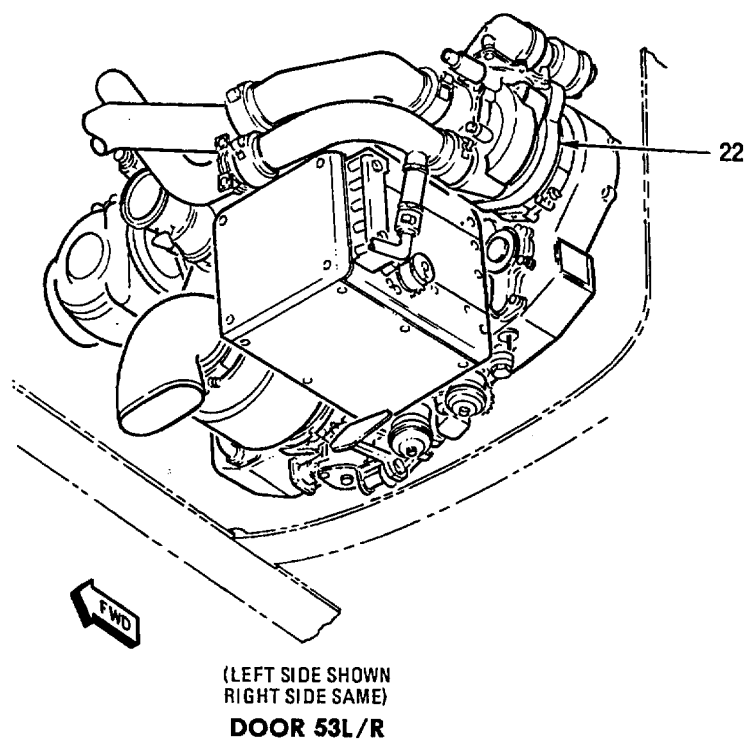


Figure 1. Internal Fuel Transfer System Component Locator (Sheet 7)

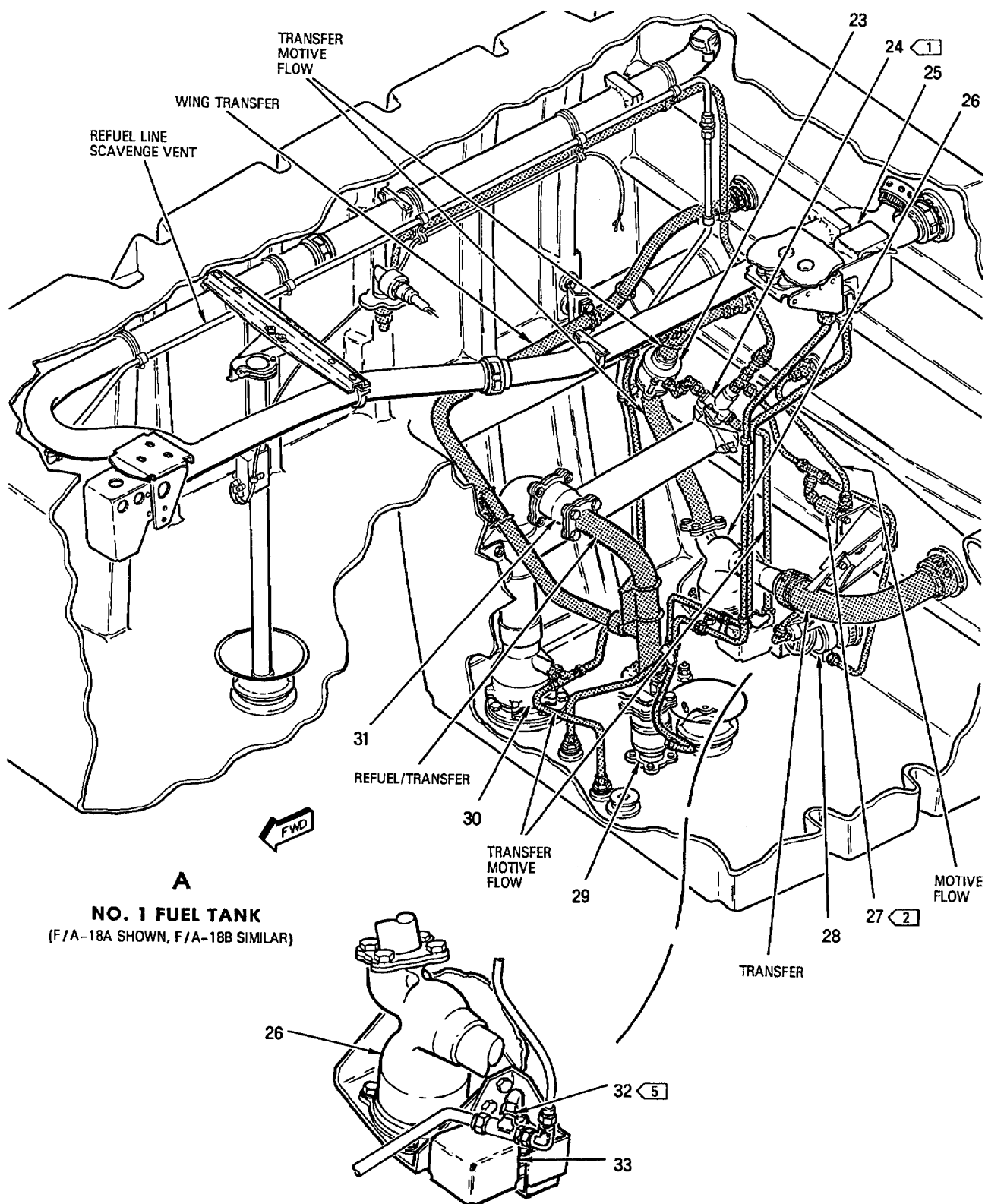


Figure 1. Internal Fuel Transfer System Component Locator (Sheet 8)

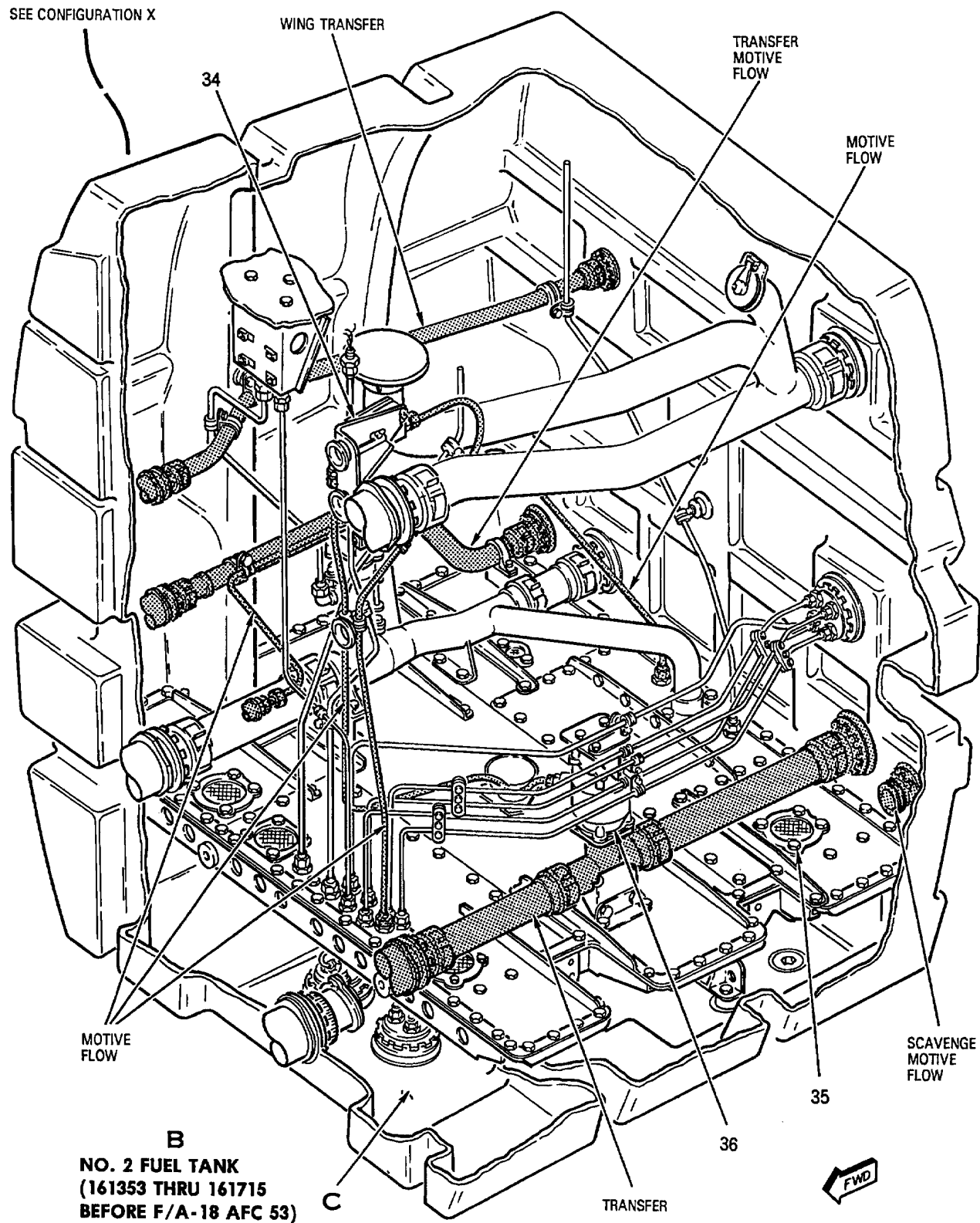


Figure 1. Internal Fuel Transfer System Component Locator (Sheet 9)

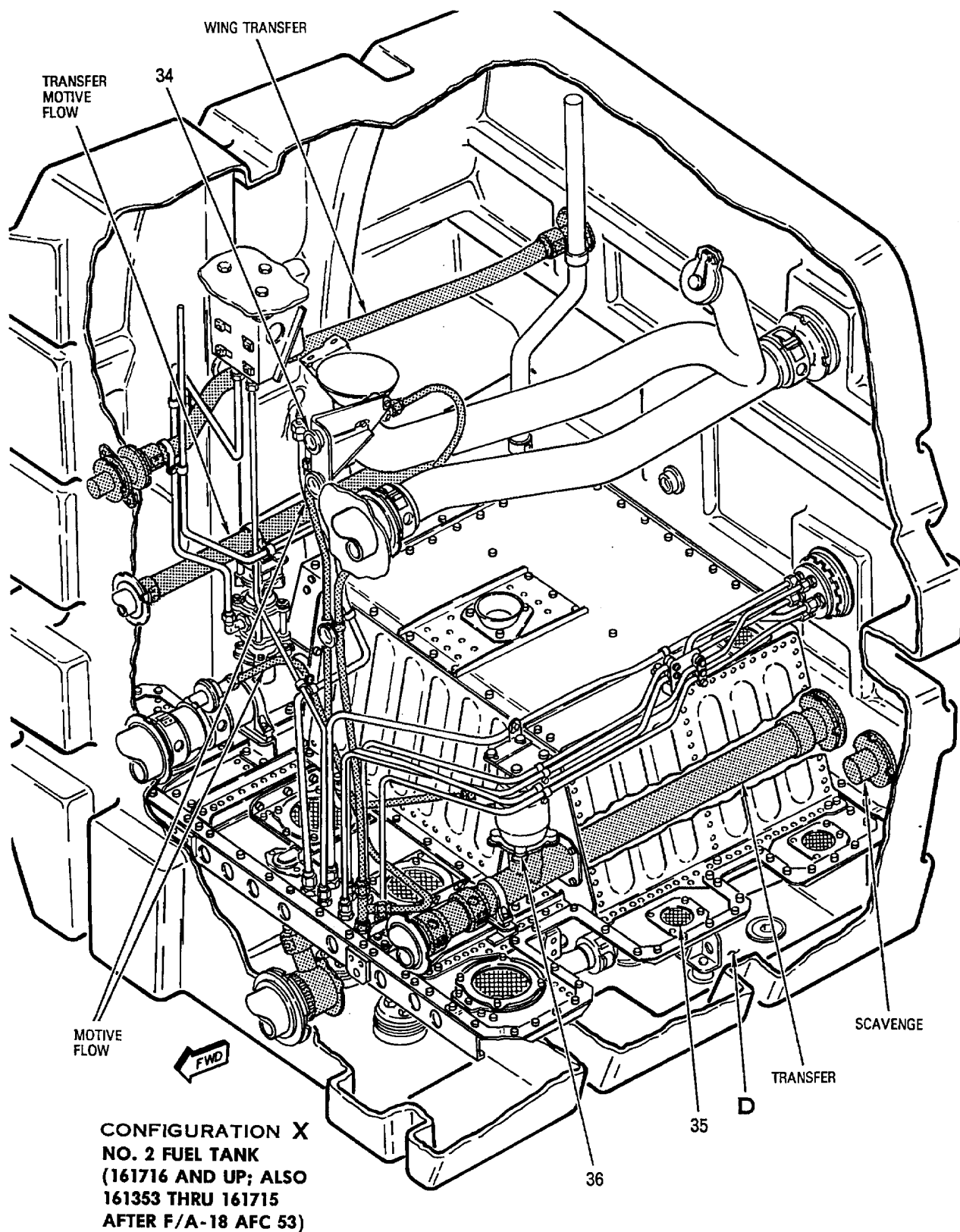
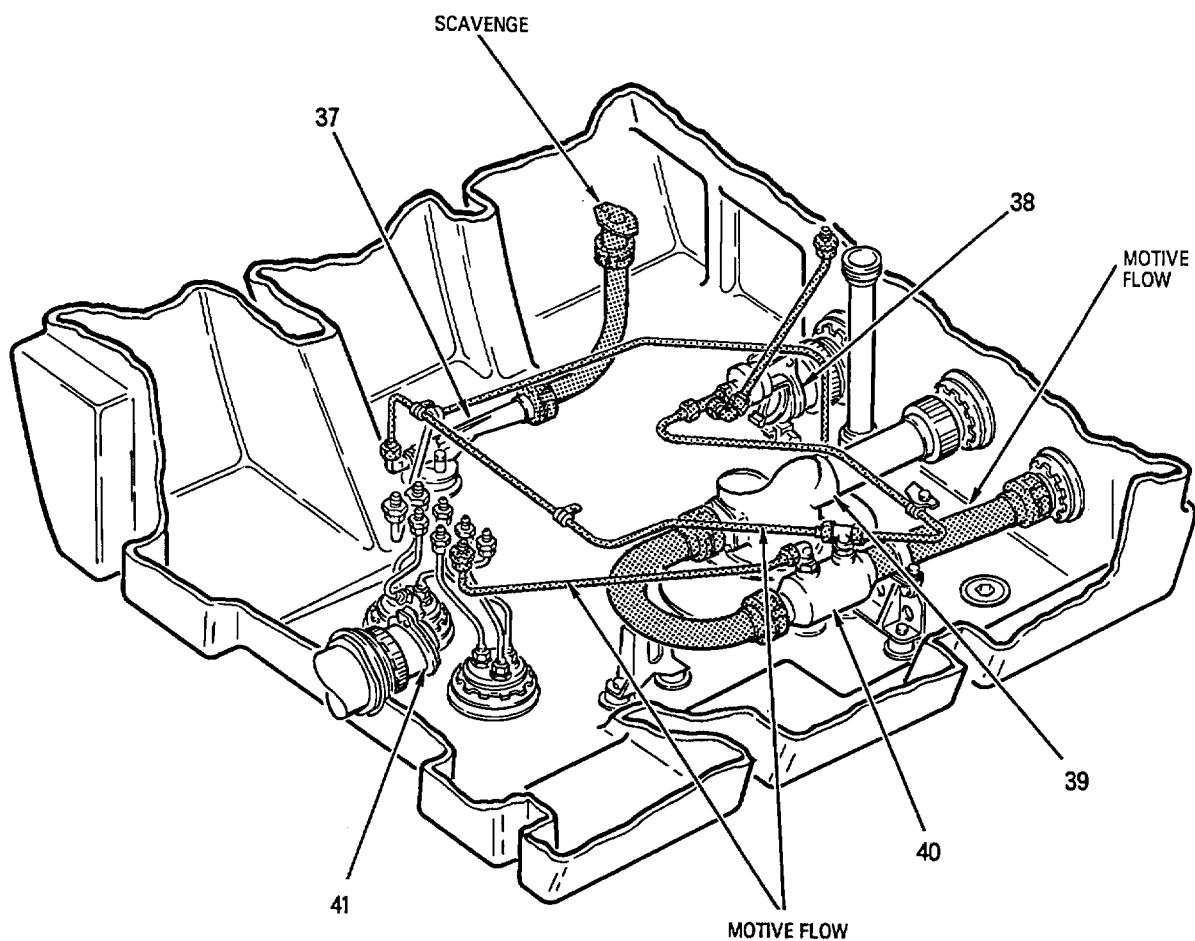


Figure 1. Internal Fuel Transfer System Component Locator (Sheet 10)



C

**NO. 2 FUEL TANK  
(161353 THRU 161715  
BEFORE F/A-18 AFC 18)  
BELOW BAFFLE**

**Figure 1. Internal Fuel Transfer System Component Locator (Sheet 11)**



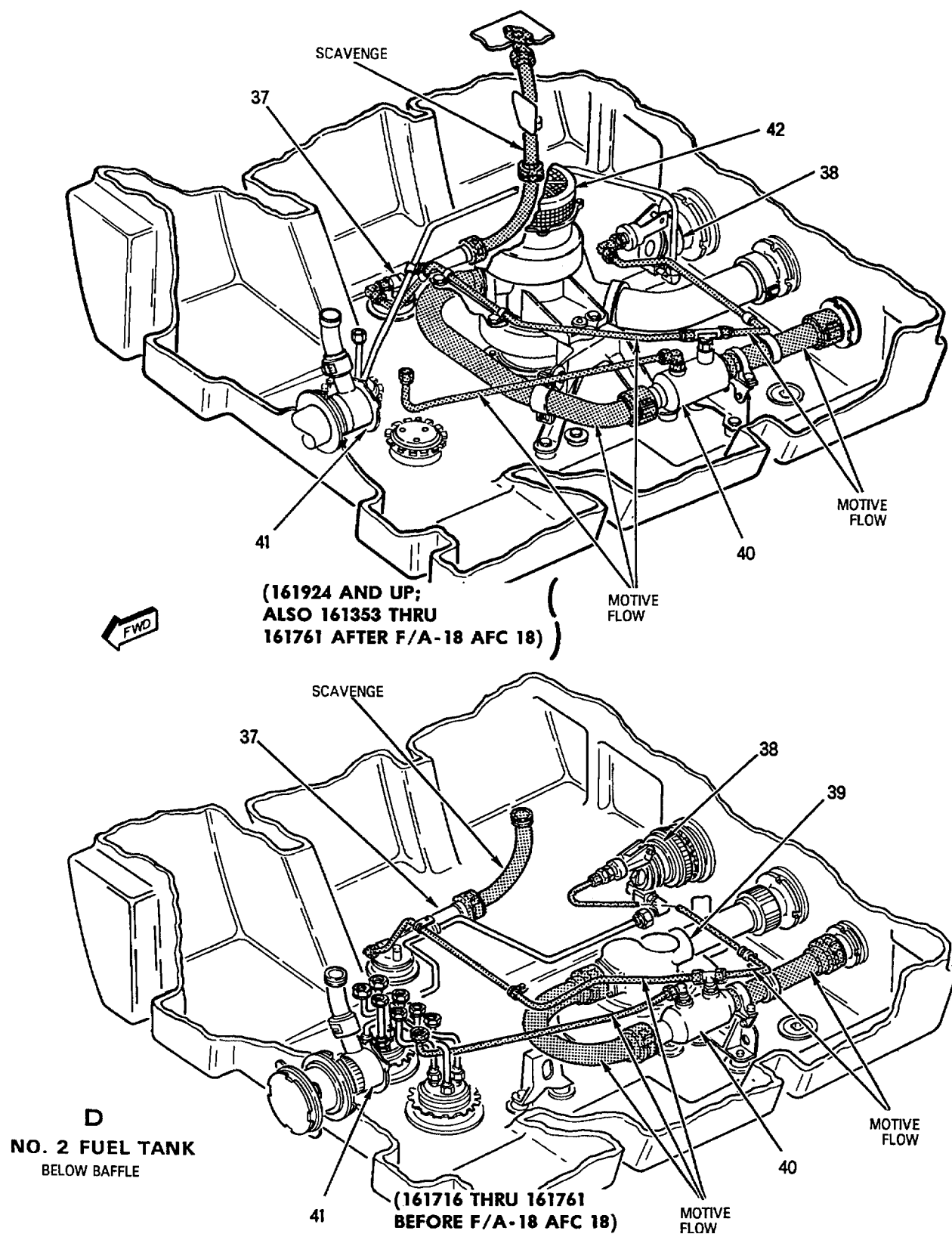
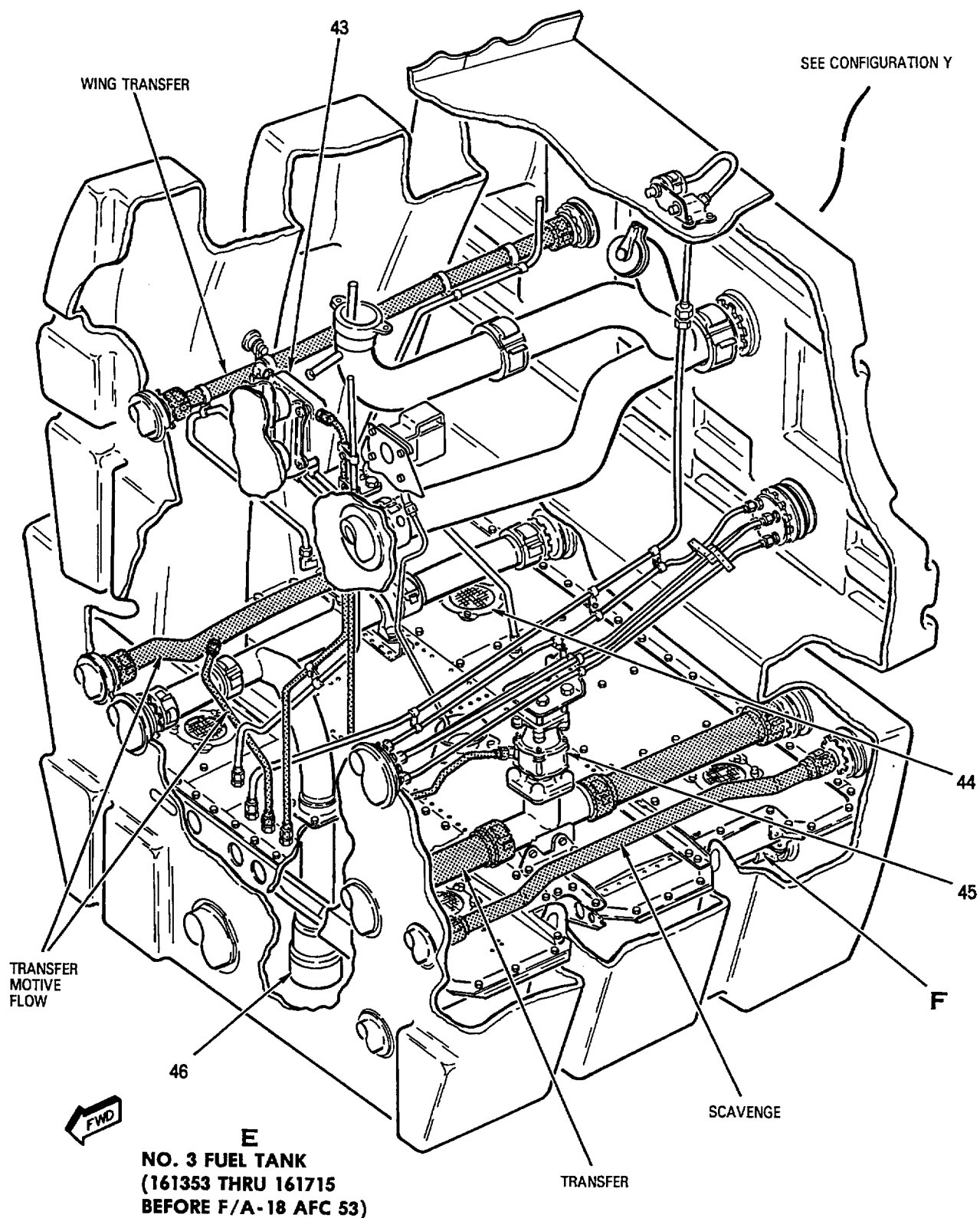
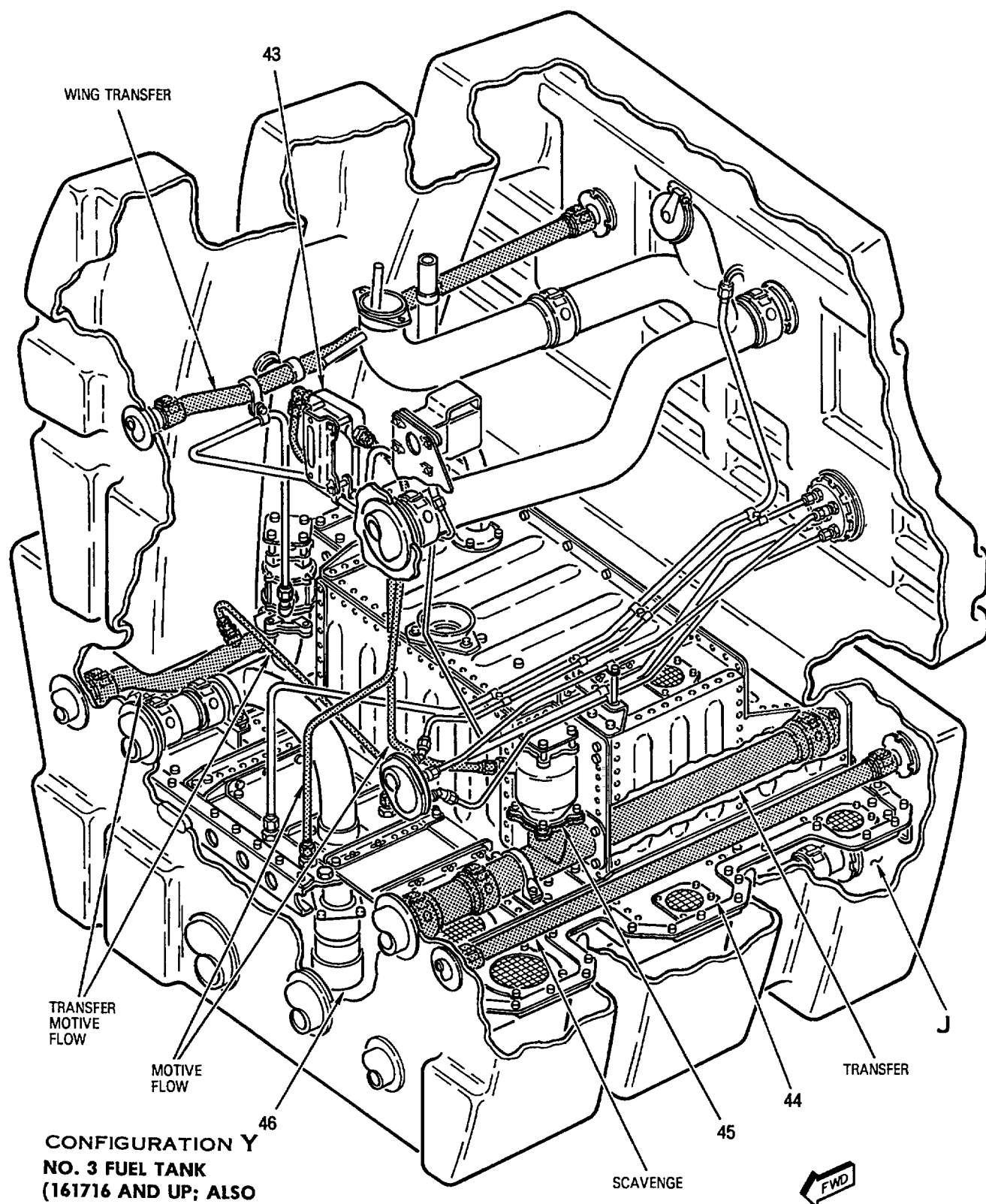


Figure 1. Internal Fuel Transfer System Component Locator (Sheet 12)



18AC-460-10-(6-13)19

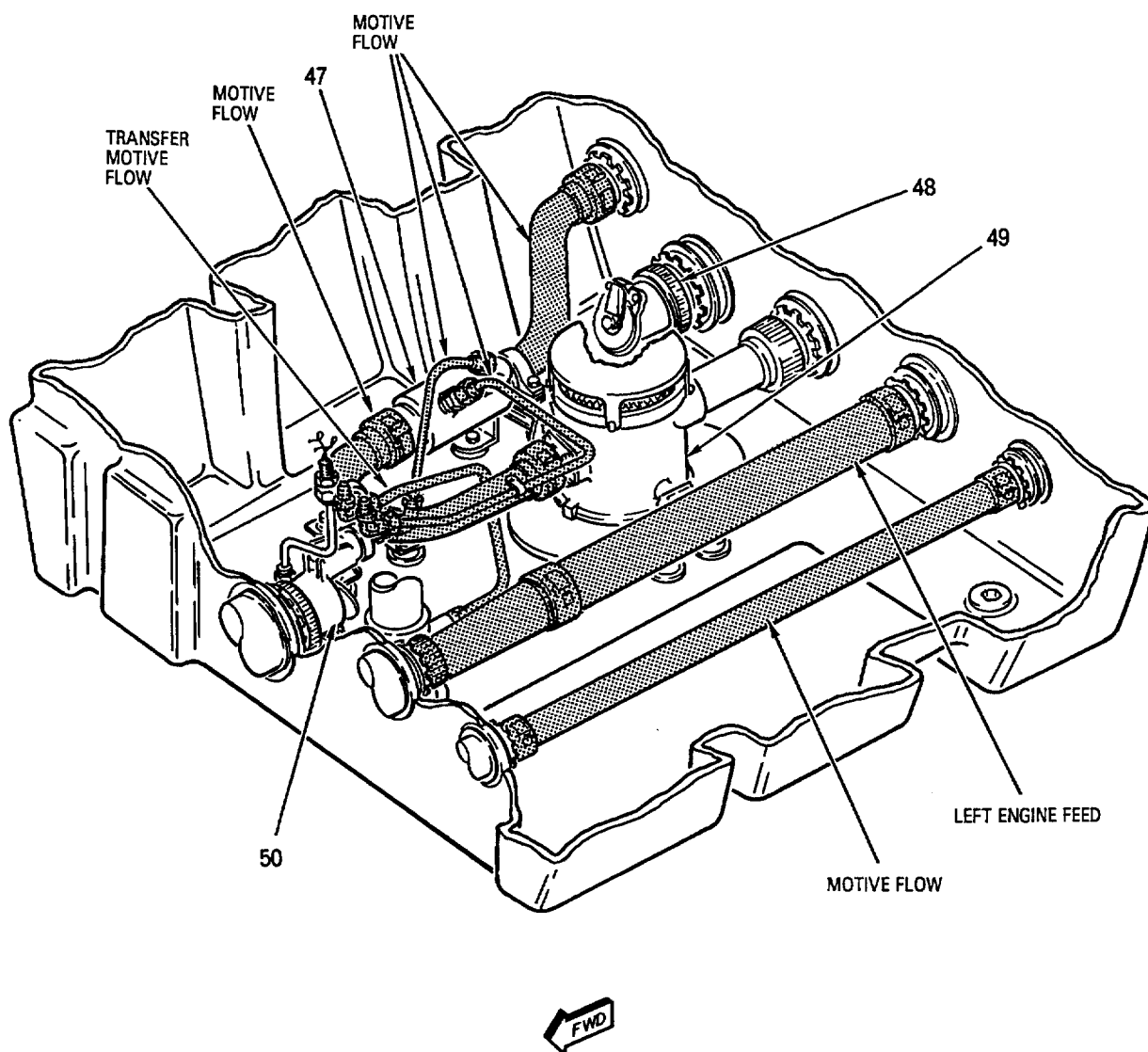
Figure 1. Internal Fuel Transfer System Component Locator (Sheet 13)



**CONFIGURATION Y**  
**NO. 3 FUEL TANK**  
 (161716 AND UP; ALSO  
 161353 THRU 161715  
 AFTER F/A-18 AFC 53)

18AC-460-10-(6-14)19

**Figure 1. Internal Fuel Transfer System Component Locator (Sheet 14)**



**F**  
**NO. 3 FUEL TANK**  
**(161353 THRU 161715**  
**BEFORE F/A-18 AFC 18)**  
BELOW BAFFLE

**Figure 1. Internal Fuel Transfer System Component Locator (Sheet 15)**

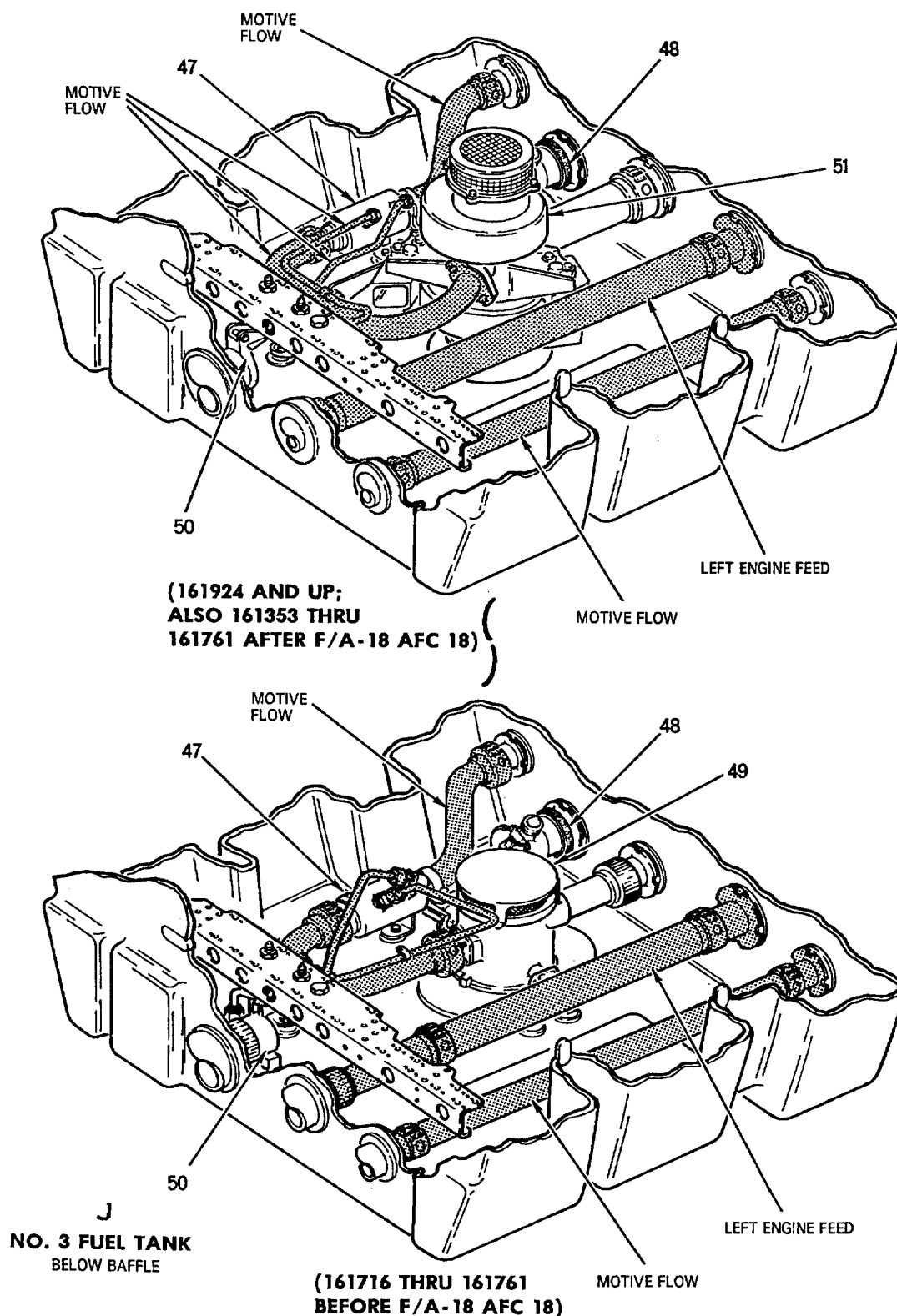
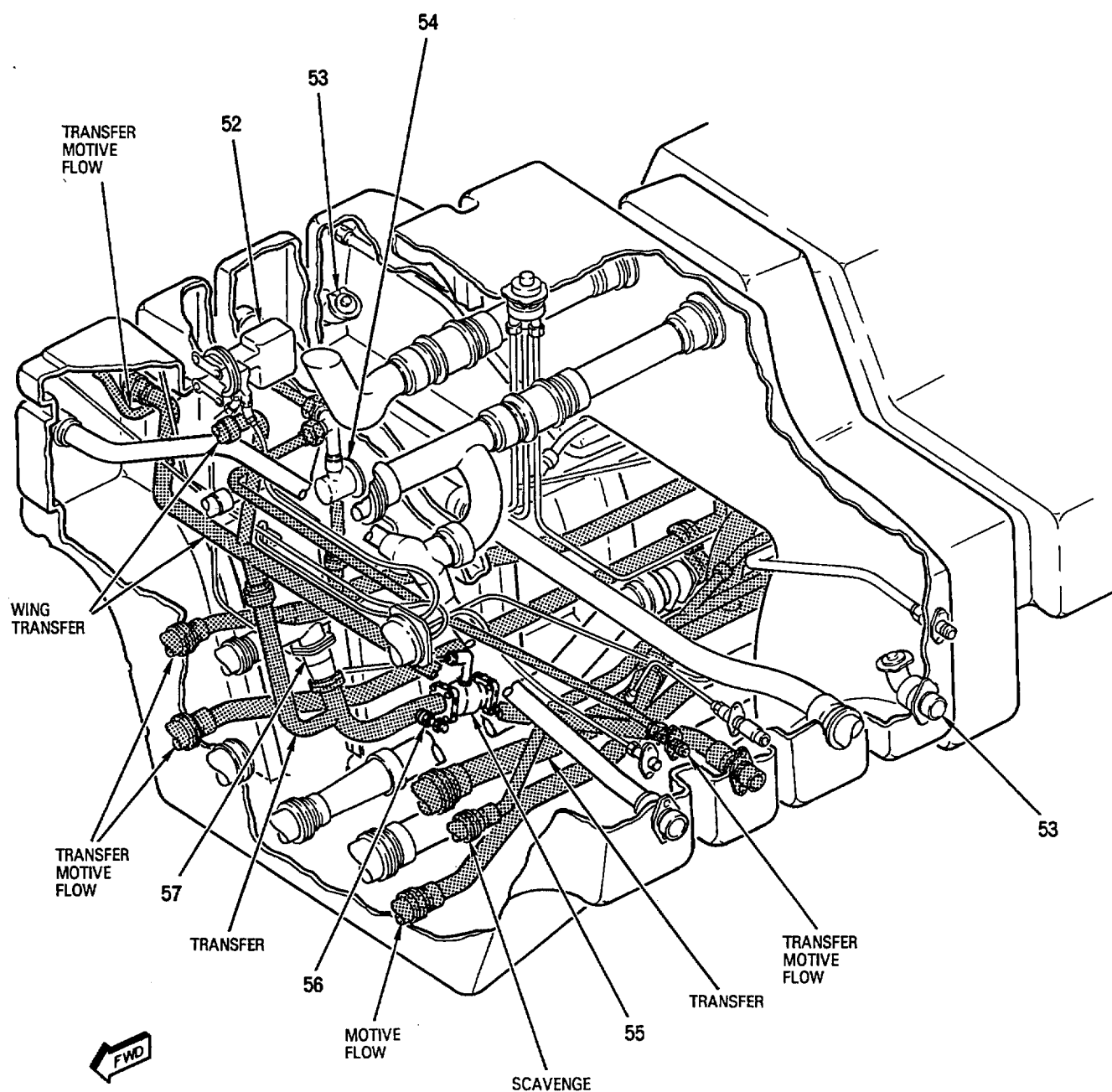
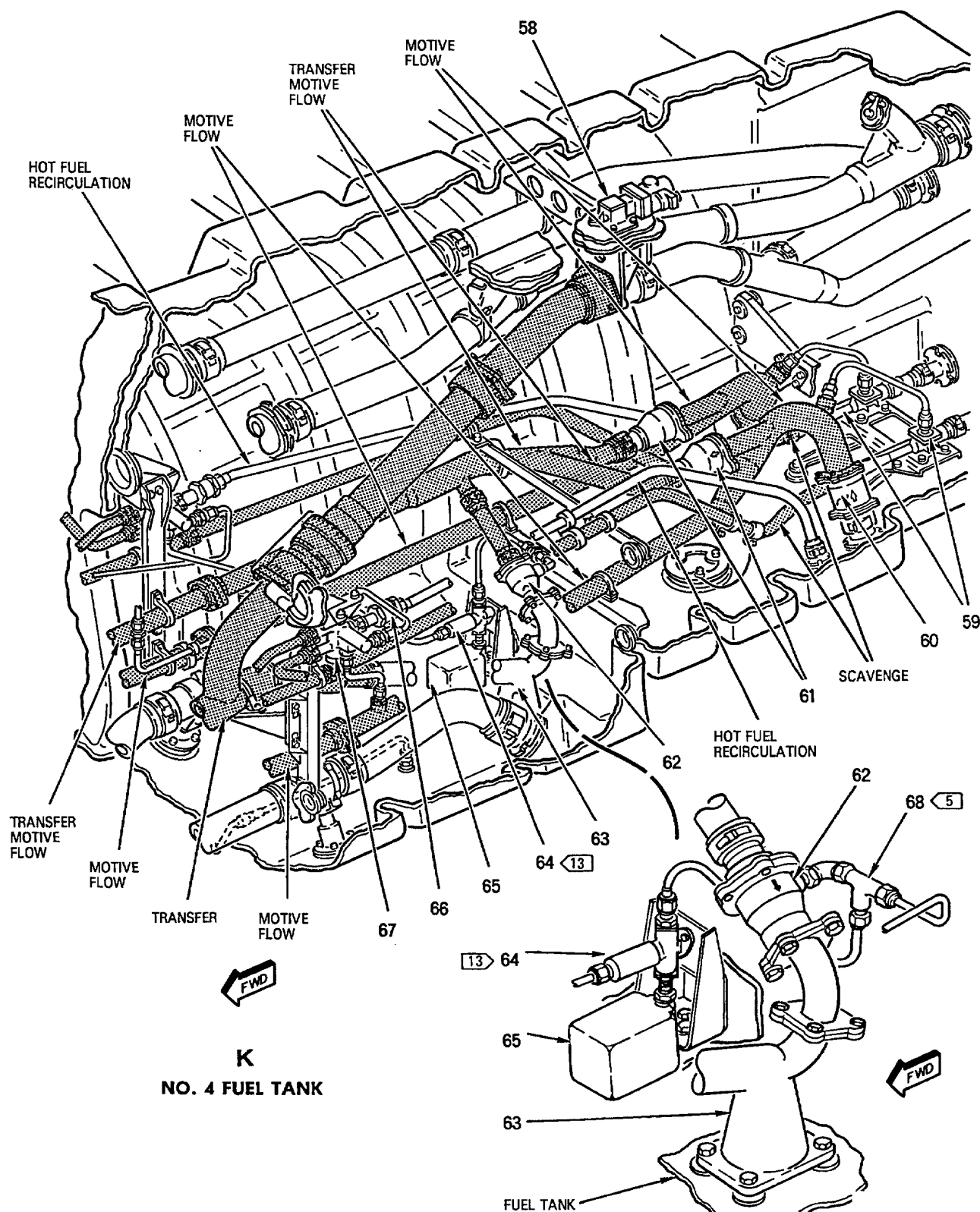


Figure 1. Internal Fuel Transfer System Component Locator (Sheet 16)



**K**  
**NO. 4 FUEL TANK**

**Figure 1. Internal Fuel Transfer System Component Locator (Sheet 17)**



18AC-460-10-(6-18)H

Figure 1. Internal Fuel Transfer System Component Locator (Sheet 18)

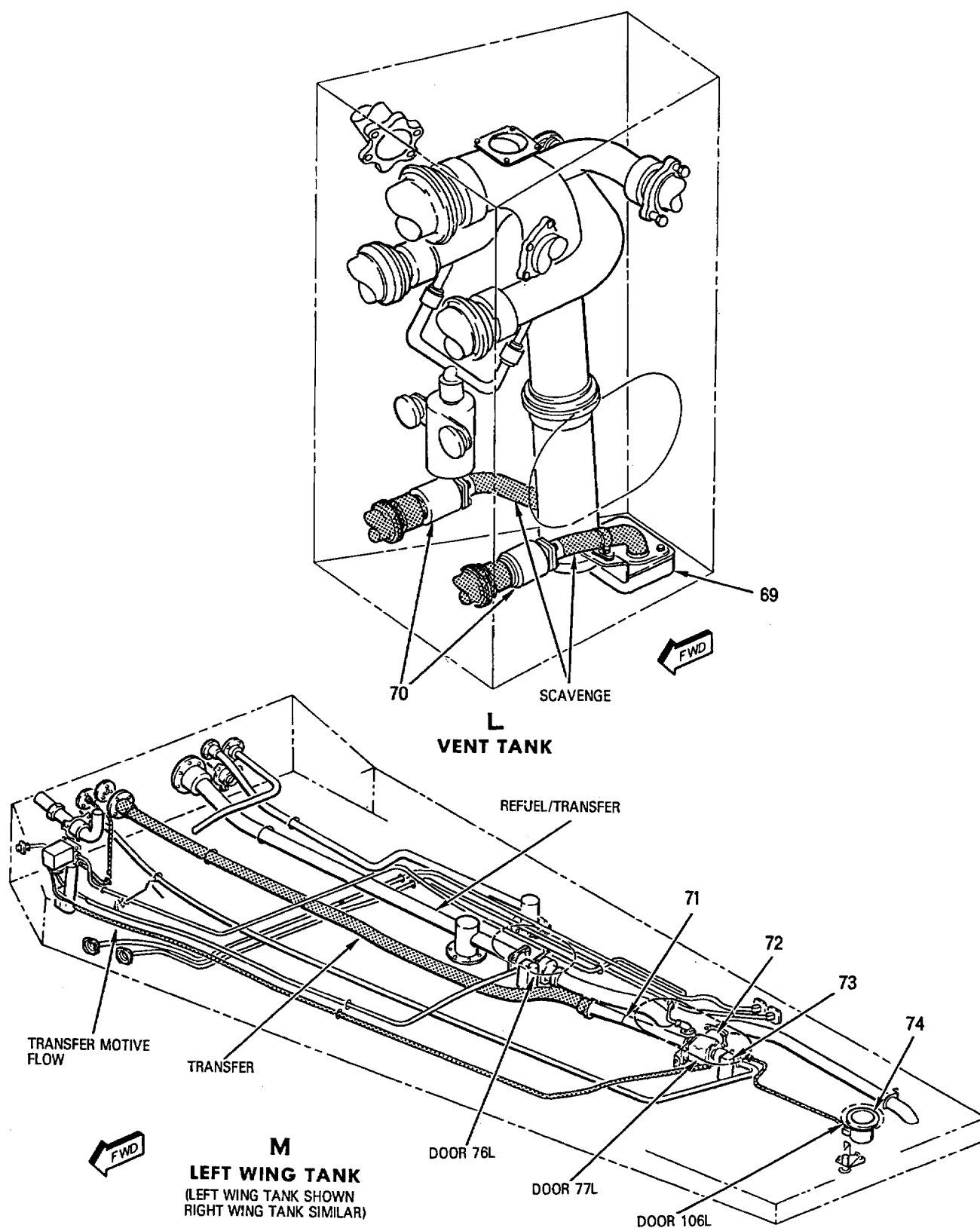


Figure 1. Internal Fuel Transfer System Component Locator (Sheet 19)



## LEGEND

1	161520 AND UP.
2	161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39.
3	161353 THRU 161761 BEFORE F/A-18 AFC 39.
4	161753 THRU 161761.
5	161353 THRU 161965 BEFORE F/A-18 AFC 53.
6	161924 THRU 161987; ALSO 161353 THRU 161519 BEFORE F/A-18 AFC 48.
7	161520 THRU 161987.
8	162394 AND UP.
9	161520 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 21.
10	161702 AND UP.
11	161353 THRU 161528.
12	161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 18.
13	161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 53.
14	161353 THRU 161761 BEFORE F/A-18 AFC 18.
15	161520 THRU 161761 BEFORE F/A-18 AFC 53.
16	161924 AND UP.
17	162394 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 48.

Nomenclature	Index No.	Ref Des
1 AIR DATA COMPUTER CP-1334/A	9	70A-F001
2 CONTROL CONVERTER C-10382/A	10	82A-F001
DEFUEL VALVE	46	5VAP521
DIGITAL DATA COMPUTER NO. 1	7	83A-E001
DIGITAL DISPLAY INDICATOR ID-2150/ASM-612	11	85A-G003
ENGINE MOTIVE FLOW CHECK VALVE	60	
LEFT		5VAP561
RIGHT		5VAR562
ENGINE TRANSFER MOTIVE FLOW CHECK VALVE	61	
LEFT		5VAP563
RIGHT		5VAR564
EXT LT CONTROL PANEL ASSEMBLY	3	52A-H091
INTR WING SWITCH		5S-H026
9 FUEL AIR HEAT EXCHANGER	20	
LEFT		5MPP670
RIGHT		5MPR671
FUEL CHECK PANEL	13	5A-B019
TK INTCON V CHK SWITCH		5S-B141

Figure 1. Internal Fuel Transfer System Component Locator (Sheet 20)

Nomenclature	Index No.	Ref Des
FUEL DIVERTER VALVE LEFT RIGHT	67	5L-P119 5L-R118
FUEL DUMP VALVE	58	5B-P069
FUEL LEVEL CONTROL SELECTOR VALVE	8	5VAG579
FUEL QUANTITY GAGING INTERMEDIATE DEVICE	14	5A-F014
4 FUEL TRANSFER TUBE AND STRAINER LEFT RIGHT	21	5FAU681 5FAV682
FUSELAGE TRANSFER PRESSURE TRANSDUCER	18	6MTP126
HOT FUEL RECIRCULATION CHECK VALVE LEFT RIGHT	66	5VAP685 5VAR584
LEFT DIGITAL DISPLAY INDICATOR IP-1317/A	2	80A-H001
LH ADVISORY AND THREAT WARNING INDICATOR PANEL	1	52A-H073
MOTIVE FLOW BOOST PUMP LEFT RIGHT	22	58AT514 58AS515
NO. 1 FUEL TANK FUEL LEVEL CONTROL SHUTOFF VALVE	29	5VAP541
2 NO. 1 FUEL TANK FUEL LOW LEVEL SHUTOFF VALVE	27	5L-E171
NO. 1 FUEL TANK FUEL HIGH LEVEL PILOT VALVE	25	5VAP539
NO. 1 FUEL TANK TRANSFER PILOT VALVE	33	5VAP537
NO. 1 FUEL TANK PRESSURE OPERATED INTERCONNECT VALVE	28	3 5VAP538 2 5S-E172
NO. 1 FUEL TANK REFUEL TRANSFER CHECK VALVE	31	5VAP532
1 NO. 1 FUEL TANK TRANSFER CONTROL VALVE	24	5L-F160
NO. 1 FUEL TANK TRANSFER JET EJECTOR	26	58AP536
5 NO. 1 FUEL TANK TRANSFER PRECHECK VALVE	32	5VAP606

Figure 1. Internal Fuel Transfer System Component Locator (Sheet 21)





Nomenclature	Index No.	Ref Des
NO. 1 FUEL TANK TRANSFER SHUTOFF VALVE	23	5VAP534
NO. 2 CIRCUIT BREAKER PANEL ASSEMBLY FUEL QUAN IND CIRCUIT BREAKER	12	52A-D024 5CBD044
 NO. 2 FUEL TANK ENGINE FUEL BOOST JET EJECTOR	39	5BAP599
 NO. 2 FUEL TANK ENGINE FUEL TURBINE BOOST PUMP	42	5BAP679
NO. 2 FUEL TANK FUEL LEVEL SENSOR	34	5VAP595
NO. 2 FUEL TANK GRAVITY FEED CHECK VALVE	41	5VAP600
NO. 2 FUEL TANK INVERTED FLIGHT CHECK VALVES	35	-
NO. 2 FUEL TANK PRESSURE OPERATED INTERCONNECT VALVE	38	5S-R132
NO. 2 FUEL TANK TRANSFER SHUTOFF VALVE	36	5VAP597
NO. 2 FUEL TANK WASH FILTER	40	5FAP632
 NO. 3 FUEL TANK ENGINE FUEL BOOST JET EJECTOR	49	5BAP591
 NO. 3 FUEL TANK ENGINE FUEL TURBINE BOOST PUMP	51	5BAR680
NO. 3 FUEL TANK FUEL LEVEL SENSOR	43	5VAP590
NO. 3 FUEL TANK GRAVITY FEED CHECK VALVE	50	5VAP608
NO. 3 FUEL TANK INVERTED FLIGHT CHECK VALVES	44	-
NO. 3 FUEL TANK PRESSURE OPERATED INTERCONNECT VALVES	48	5S-R131
NO. 3 FUEL TANK TRANSFER SHUTOFF VALVE	45	5VAP605
NO. 3 FUEL TANK WASH FILTER	47	5FAP633
NO. 4 FUEL TANK AUTOMATIC DRAIN VALVE	56	5VAP568
NO. 4 FUEL TANK FUEL LEVEL CONTROL SHUTOFF VALVE	55	5VAP569
NO. 4 FUEL TANK HIGH LEVEL PILOT VALVE	52	5VAP556
NO. 4 FUEL TANK TRANSFER PILOT VALVE	65	5VAP519

Figure 1. Internal Fuel Transfer System Component Locator (Sheet 22)













Nomenclature	Index No.	Ref Des
NO. 4 FUEL TANK REFUEL TRANSFER CHECK VALVE	57	5VAP557
 NO. 4 FUEL TANK TRANSFER CONTROL VALVE	64	5L-R167
NO. 4 FUEL TANK TRANSFER JET EJECTOR	63	5VAP567
 NO. 4 FUEL TANK TRANSFER PRECHECK VALVE	68	5VAP589
NO. 4 FUEL TANK TRANSFER SHUTOFF VALVE	62	5VAP565
NO. 4 FUEL TANK VENT SCAVENGE JET EJECTOR	59	
LEFT		5BAP559
RIGHT		5BAR560
NO. 7 CIRCUIT BREAKER RELAY PANEL ASSEMBLY	6	52A-C057
 FUEL LOW LEVEL RELAY NO. 1		5K-C163
 FUEL TEST CIRCUIT BREAKER		5CBC162
 FUEL TRANSFER CIRCUIT BREAKER		5CBC157
 NEGATIVE G RELAY		5K-C161
 TANK 1 TRANSFER CIRCUIT BREAKER		5CBC157
 TANK 1 TRANSFER CONTROL RELAY		5K-C158
 TANK 1 TRANSFER TIME DELAY RELAY		5K-C159
NO. 8 CIRCUIT BREAKER/RELAY PANEL ASSEMBLY	4	52A-C159
FUEL LOW LEVEL RELAY NO. 2		5K-C052
FUEL V POSITION CIRCUIT BREAKER		5CBC023
WING FUEL CIRCUIT BREAKER		5CBC115
NO. 9 RELAY PANEL ASSEMBLY	5	52A-C161
 FUEL LOW LEVEL RELAY NO. 1		5K-C163
 TANK 1 TRANSFER TIME DELAY RELAY		5K-C159
REFUELING MANIFOLD SCAVENGE JET EJECTOR	37	5BAP598
REFUEL/DEFUEL SHUTOFF VALVE	30	5VAP533
SCAVENGE CONTROL VALVE	16	5VAD622
SCAVENGE PUMP INLET SCREEN	69	5FAS604
SIGNAL DATA CONVERTER CV-3493/ASM-612	17	85A-N002
SIGNAL DATA RECORDER RO-508/ASM-612	15	85A-F001
 STRAINER	72	
LEFT		5FAU685
RIGHT		5FAV686

Figure 1. Internal Fuel Transfer System Component Locator (Sheet 23)

Nomenclature	Index No.	Ref Des
VENT TANK SCAVENGE CHECK VALVE LEFT RIGHT	70	5VAS602 5VAT612
WING DAMAGE SHUTOFF VALVE	54	5L-R110
WING FUEL GRAVITY CHECK VALVE LEFT RIGHT	53	5VAP587 5VAR588
WING MOTIVE FLOW PILOT FLOAT VALVE LEFT RIGHT	74	5VAU528 5VAV529
WING MOTIVE FLOW SHUTOFF VALVE LEFT RIGHT	73	5VAU543 5VAV544
WING TRANSFER JET EJECTOR LEFT RIGHT	71	5BAU548 5BAV549
WING TRANSFER PRESSURE TRANSDUCER	19	5MTR125

Figure 1. Internal Fuel Transfer System Component Locator (Sheet 24)



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**ORGANIZATIONAL MAINTENANCE**  
**PRINCIPLES OF OPERATION**  
**SIMPLIFIED SCHEMATIC**  
**INTERNAL FUEL TRANSFER SYSTEM**

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**Reference Material**

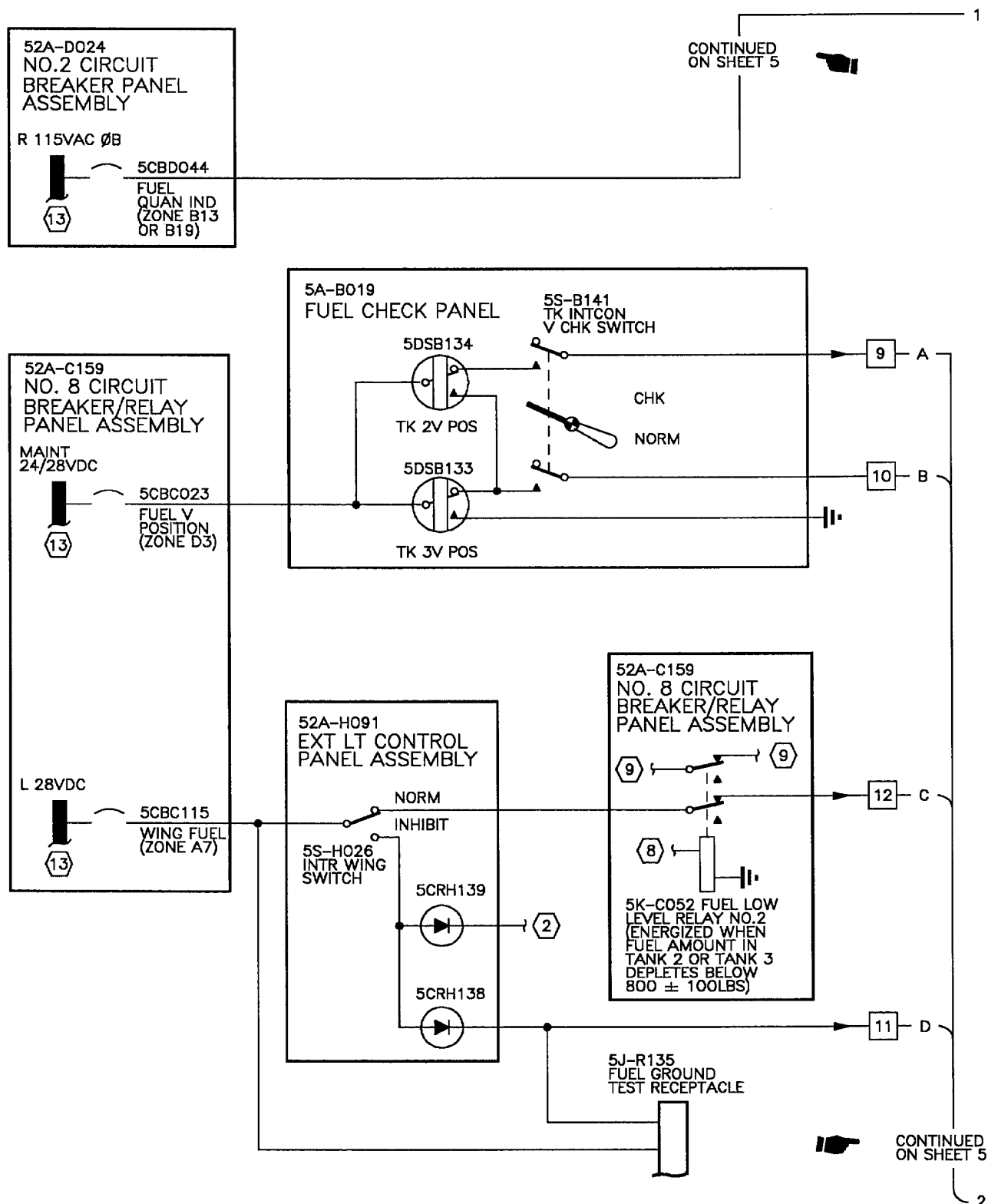
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Internal Fuel Transfer System Simplified Schematic - 161353 THRU 161519, Figure 1 .....	2
Internal Fuel Transfer System Simplified Schematic - 161520 THRU 161761, Figure 2 .....	17
Internal Fuel Transfer System Simplified Schematic - 161924 THRU 161987, Figure 3 .....	33
Internal Fuel Transfer System Simplified Schematic - 162394 AND UP, Figure 4 .....	47

**Record of Applicable Technical Directives**

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 AFC 53	-	Elimination of Tanks 1 and 4 Sneak Circuit, Tank 4 Motive Flow Shutoff Valve, and Raised Inverted Baffle (ECP-MDA-F/A-18-00055/C1)	15 Jun 86	-
F/A-18 AFC 18	-	Incorporation of Fuel Turbine Boost Pump/ Sealing of Raised Baffle in Fuel Tanks 2 and 3 (ECP-MDA-F/A-18-00077C1/C2)	15 Jun 86	-
F/A-18 AFC 21	-	Addition of Fuel/Air Heat Exchanger (ECP- MDA-F/A-18-00033)	15 Jun 86	-
F/A-18 AFC 48	-	Alternating Current Bus Isolation, (ECP- MDA-F/A-18- 00121)	15 Jun 86	-
F/A-18 AFC 39	-	No. 1 Fuel Tank Interconnect Valve Replace- ment and Fuel Sequencing Modification (ECP- MDA-F/A-18-00072C1)	1 Nov 86	-



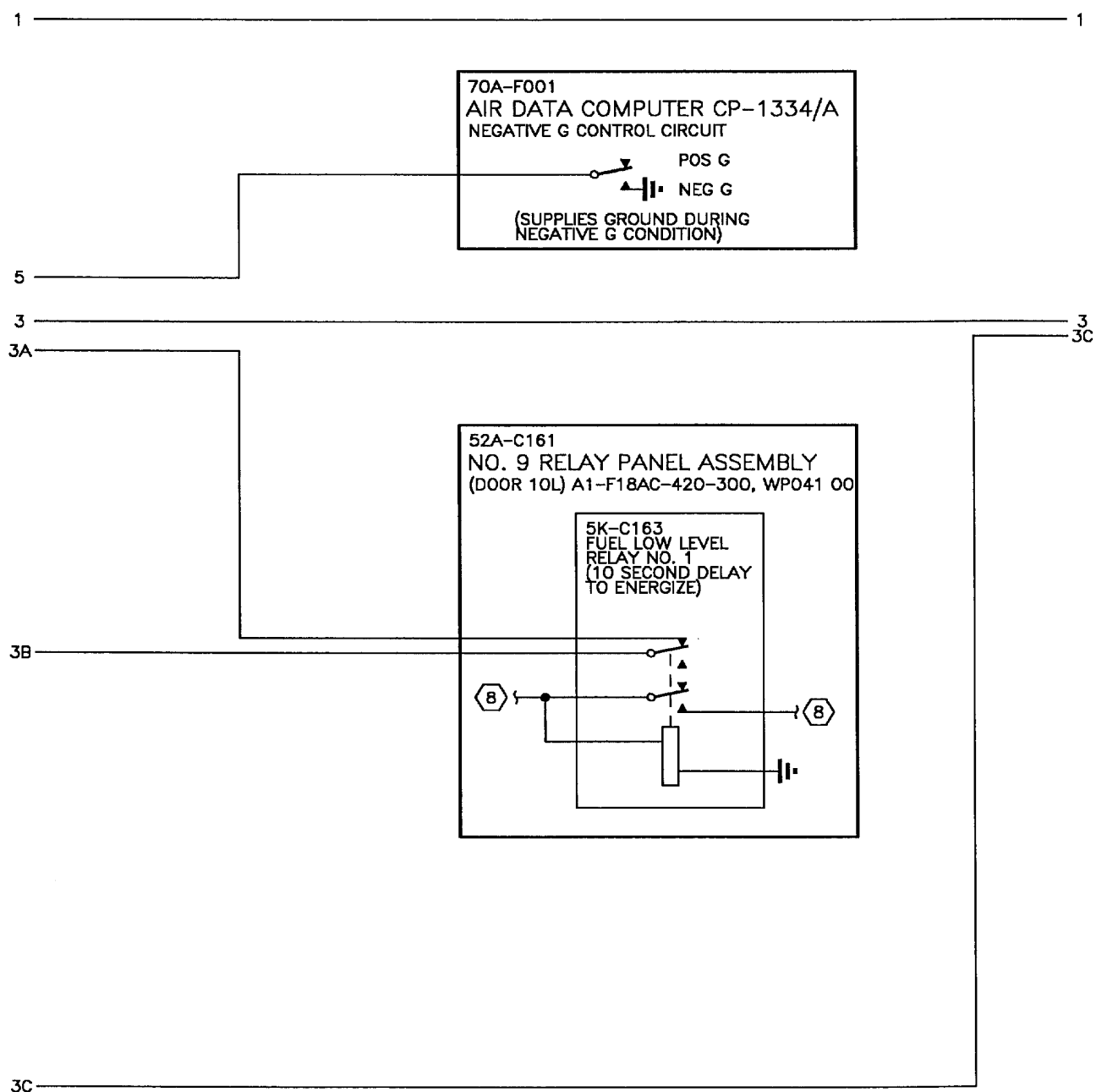
BEFORE F/A-18 AFC 39 AND 53

18AC-460-10-(30-1)22-CAT1

Figure 1. Internal Fuel Transfer System Simplified Schematic - 161353 THRU 161519  
(Sheet 1)



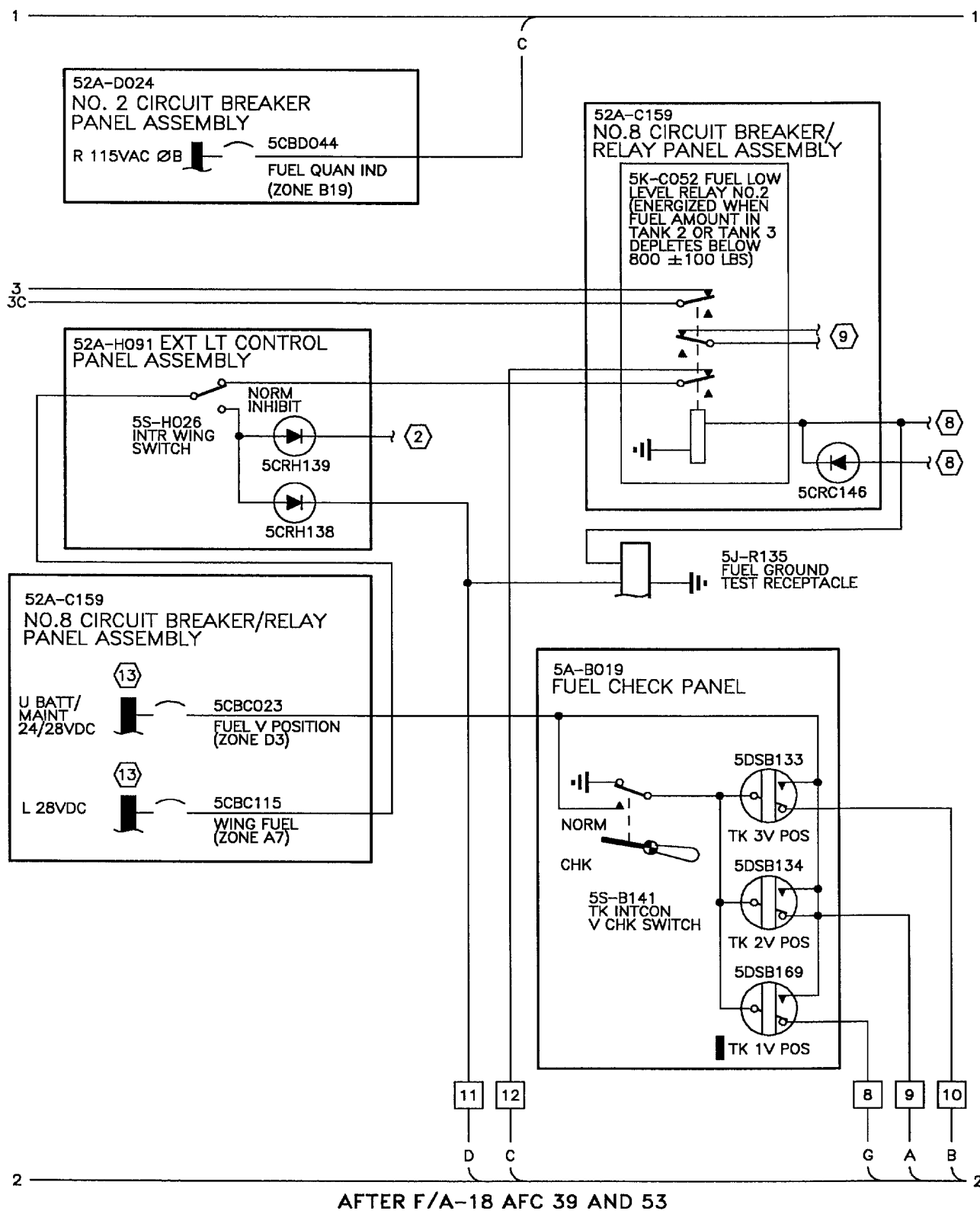




2 AFTER F/A-18 AFC 39 AND 53 2

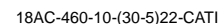
18AC-460-10-(30-3)22-CAT1

Figure 1. Internal Fuel Transfer System Simplified Schematic - 161353 THRU 161519  
(Sheet 3)



18AC-460-10-(30-4)22-CAT1

Figure 1. Internal Fuel Transfer System Simplified Schematic - 161353 THRU 161519  
(Sheet 4)



**Figure 1. Internal Fuel Transfer System Simplified Schematic - 161353 THRU 161519 (Sheet 5)**

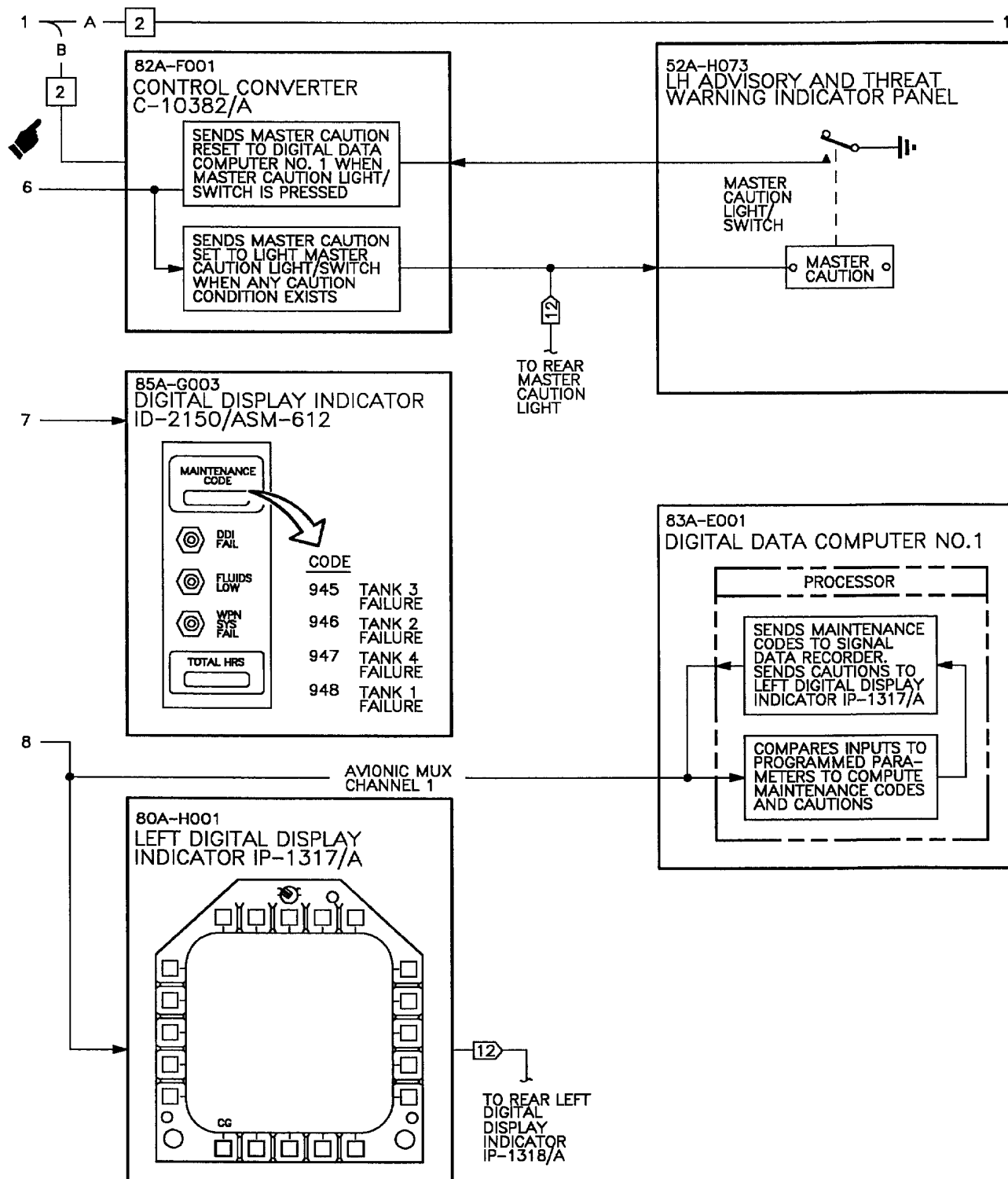
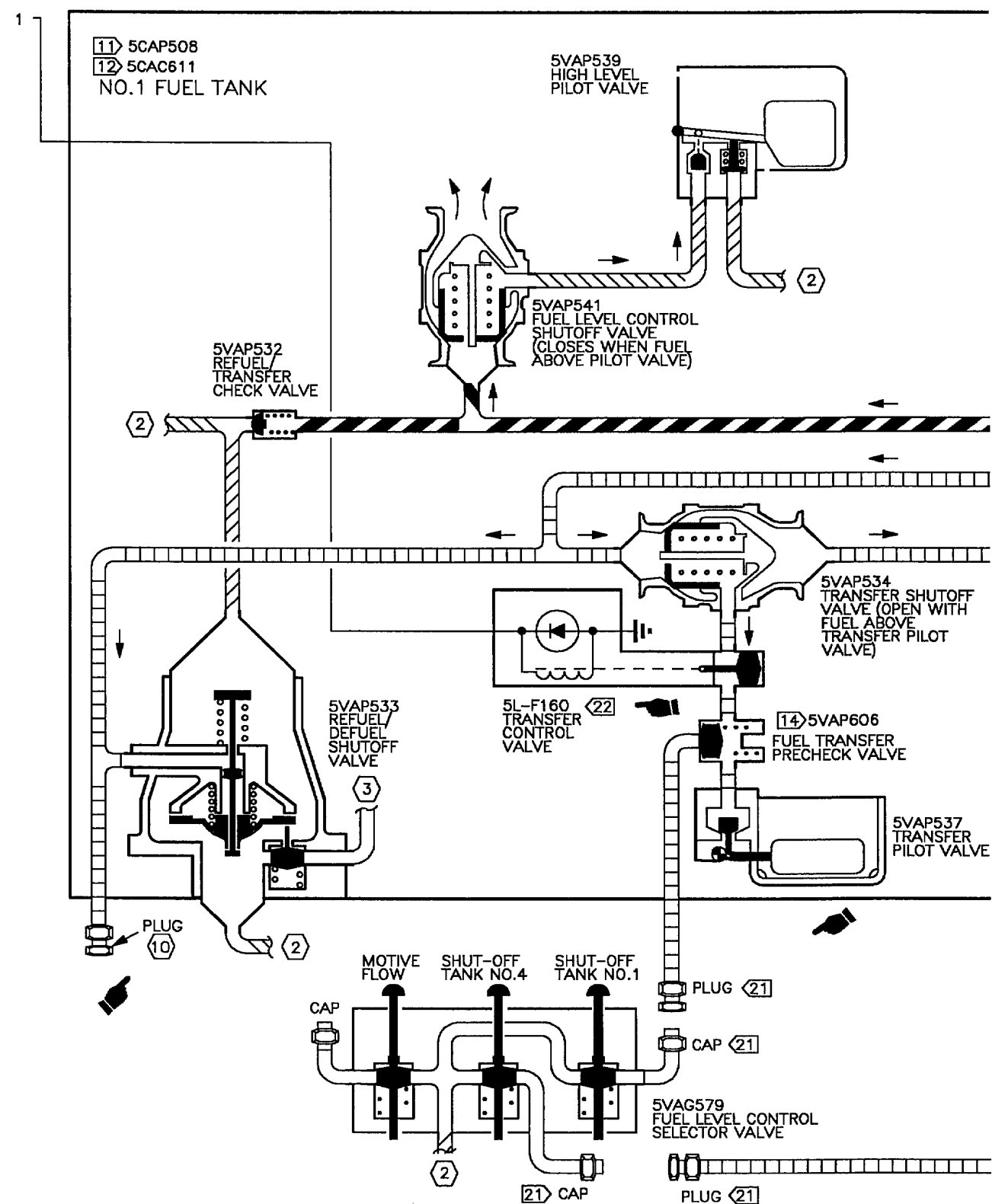
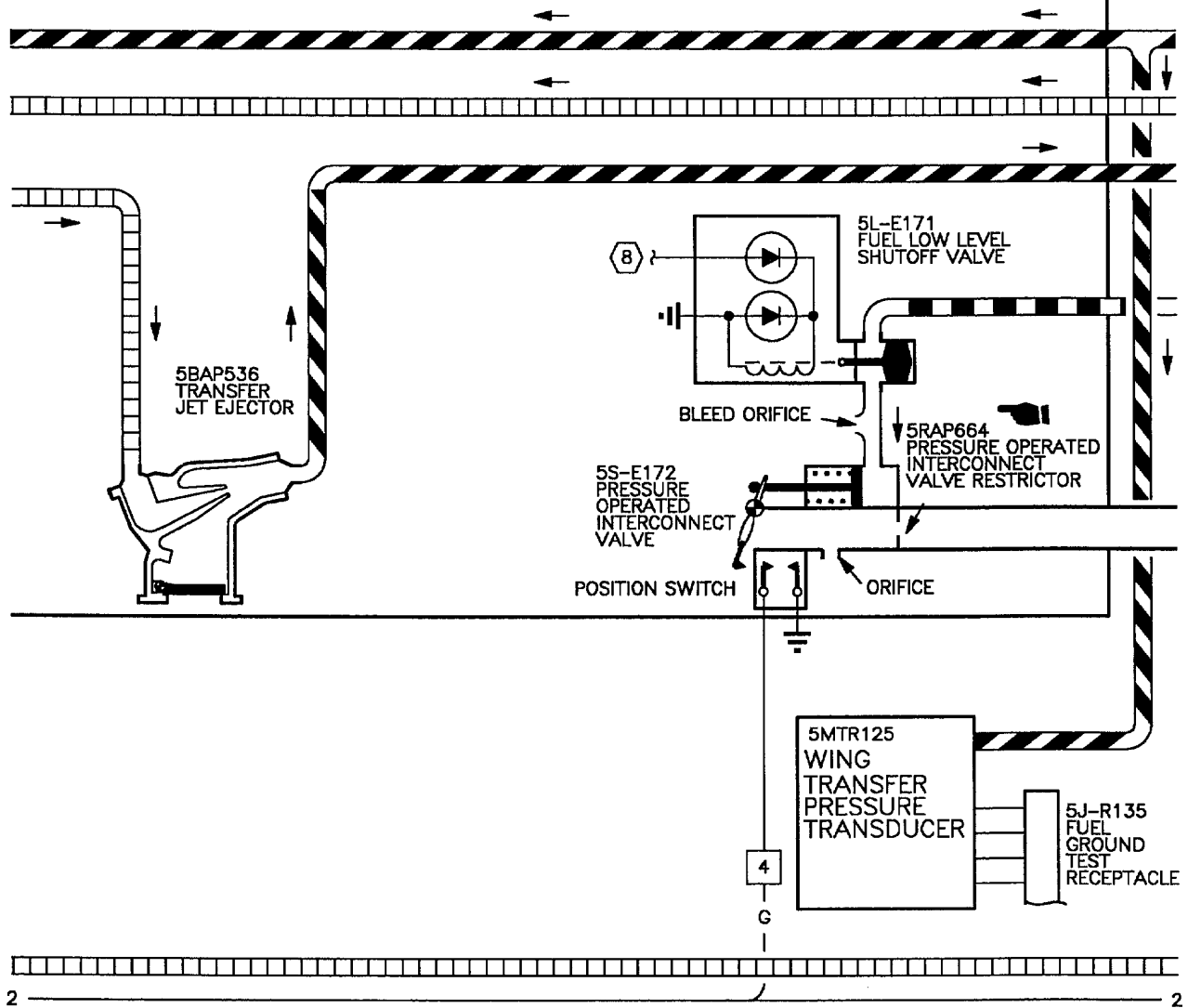


Figure 1. Internal Fuel Transfer System Simplified Schematic - 161353 THRU 161519  
(Sheet 6)



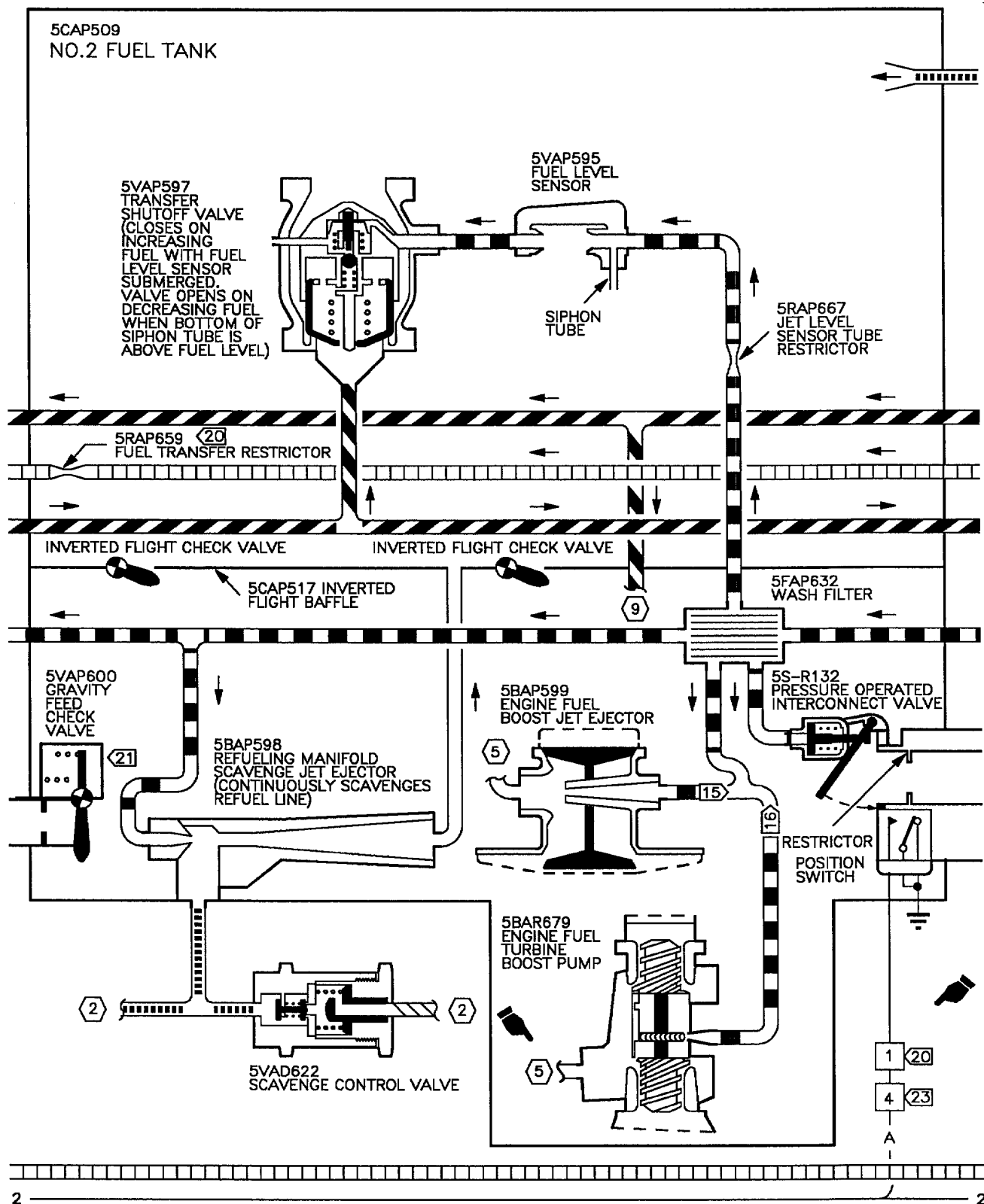
**Figure 1. Internal Fuel Transfer System Simplified Schematic - 161353 THRU 161519 (Sheet 7)**

11 5CAP508  
12 5CAC611  
NO.1 FUEL TANK



18AC-460-10-(30-8)23-CATI

Figure 1. Internal Fuel Transfer System Simplified Schematic - 161353 THRU 161519  
(Sheet 8)



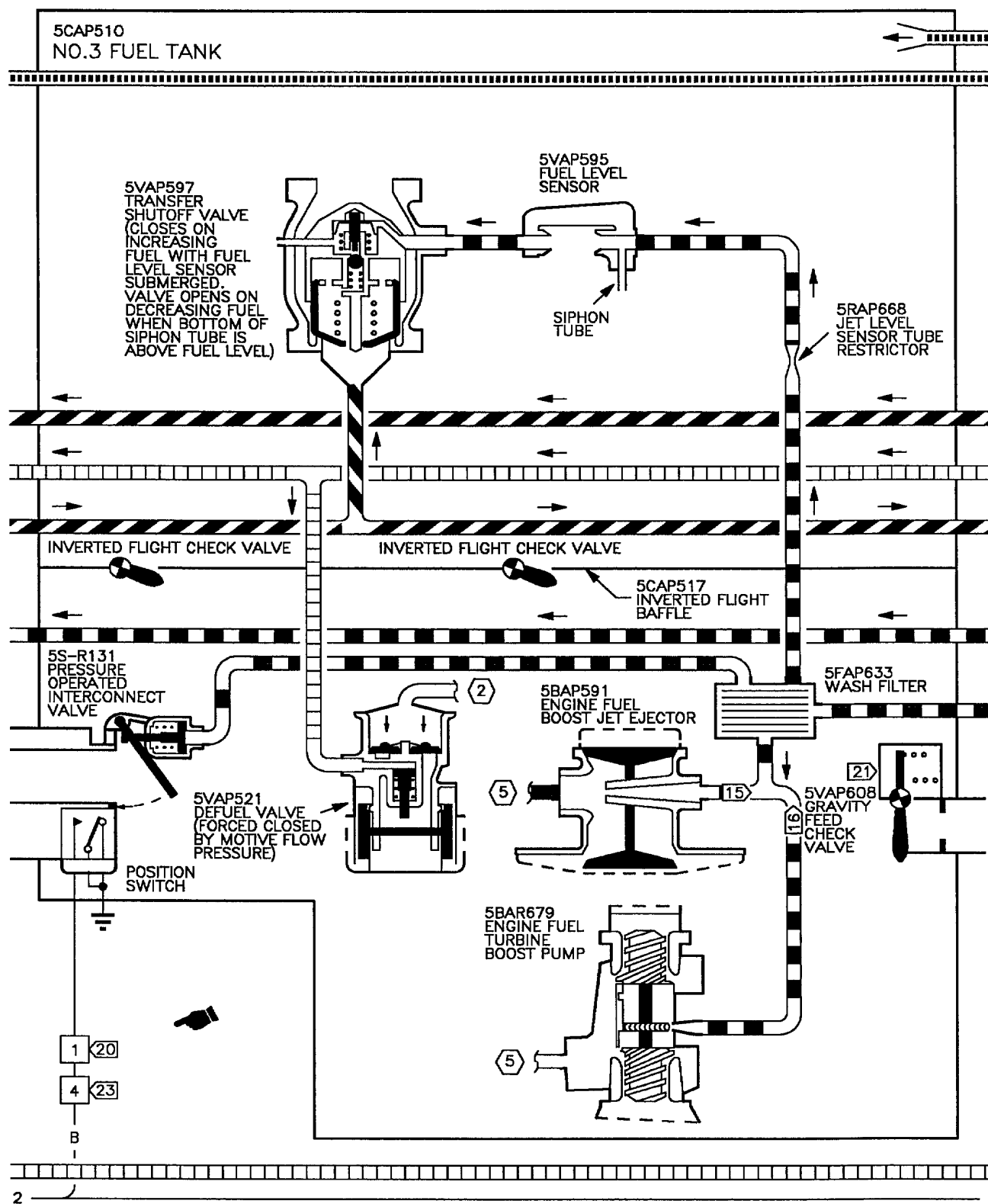
2

2

18AC-460-10-(30-9)22-CAT1

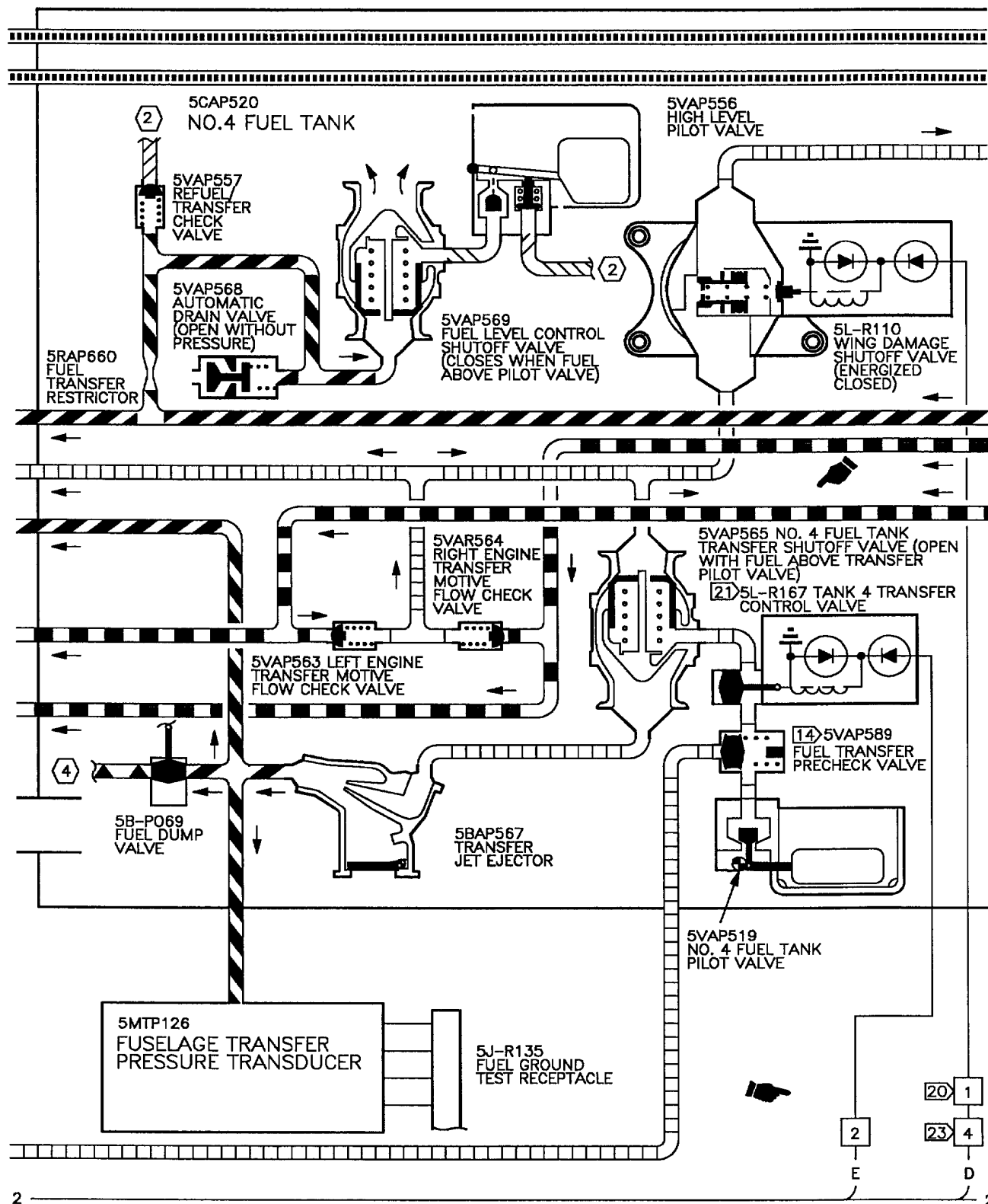
Figure 1. Internal Fuel Transfer System Simplified Schematic - 161353 THRU 161519  
(Sheet 9)





18AC-460-10-(30-10)22-CATI

Figure 1. Internal Fuel Transfer System Simplified Schematic - 161353 THRU 161519  
(Sheet 10)

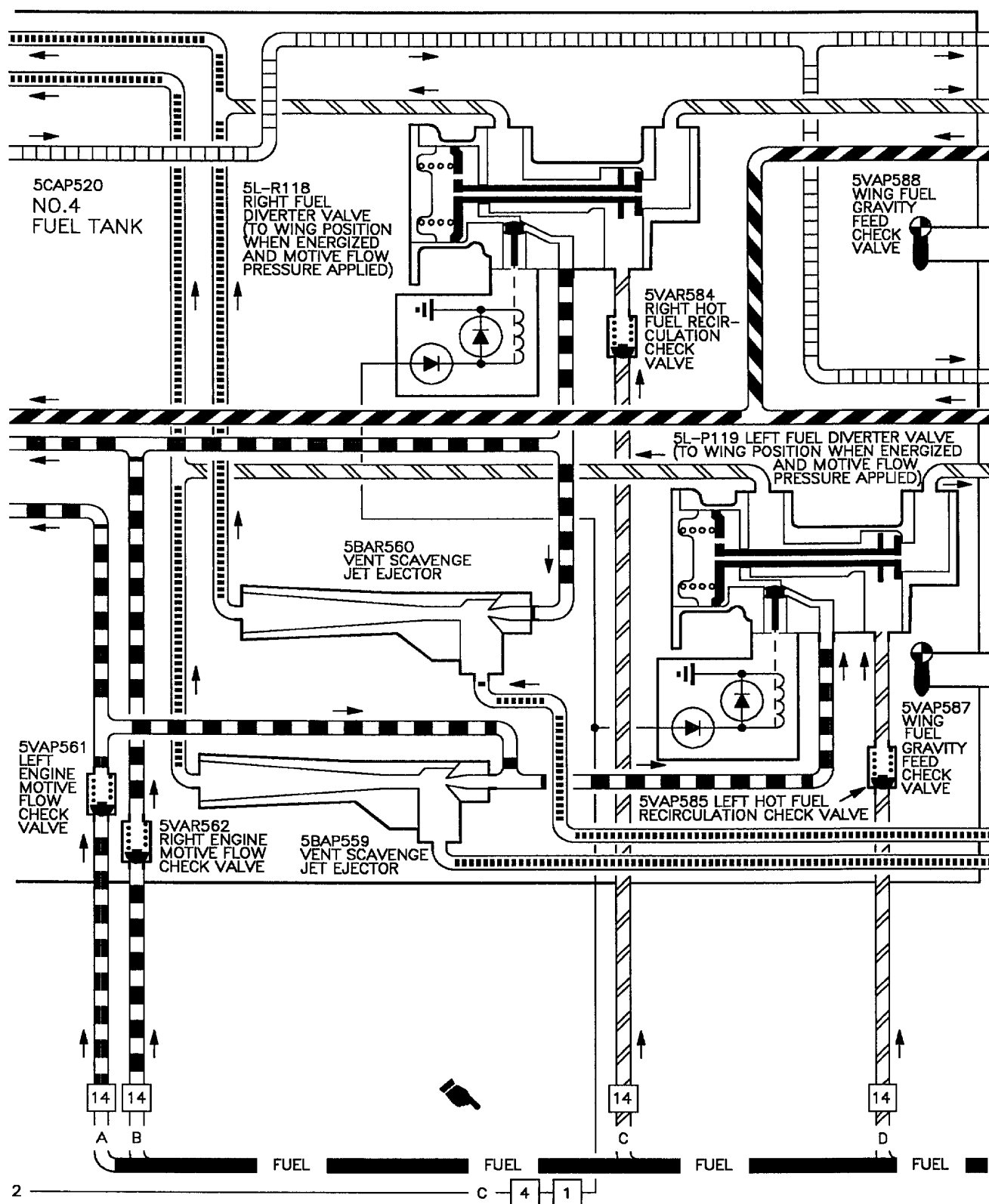


2

2

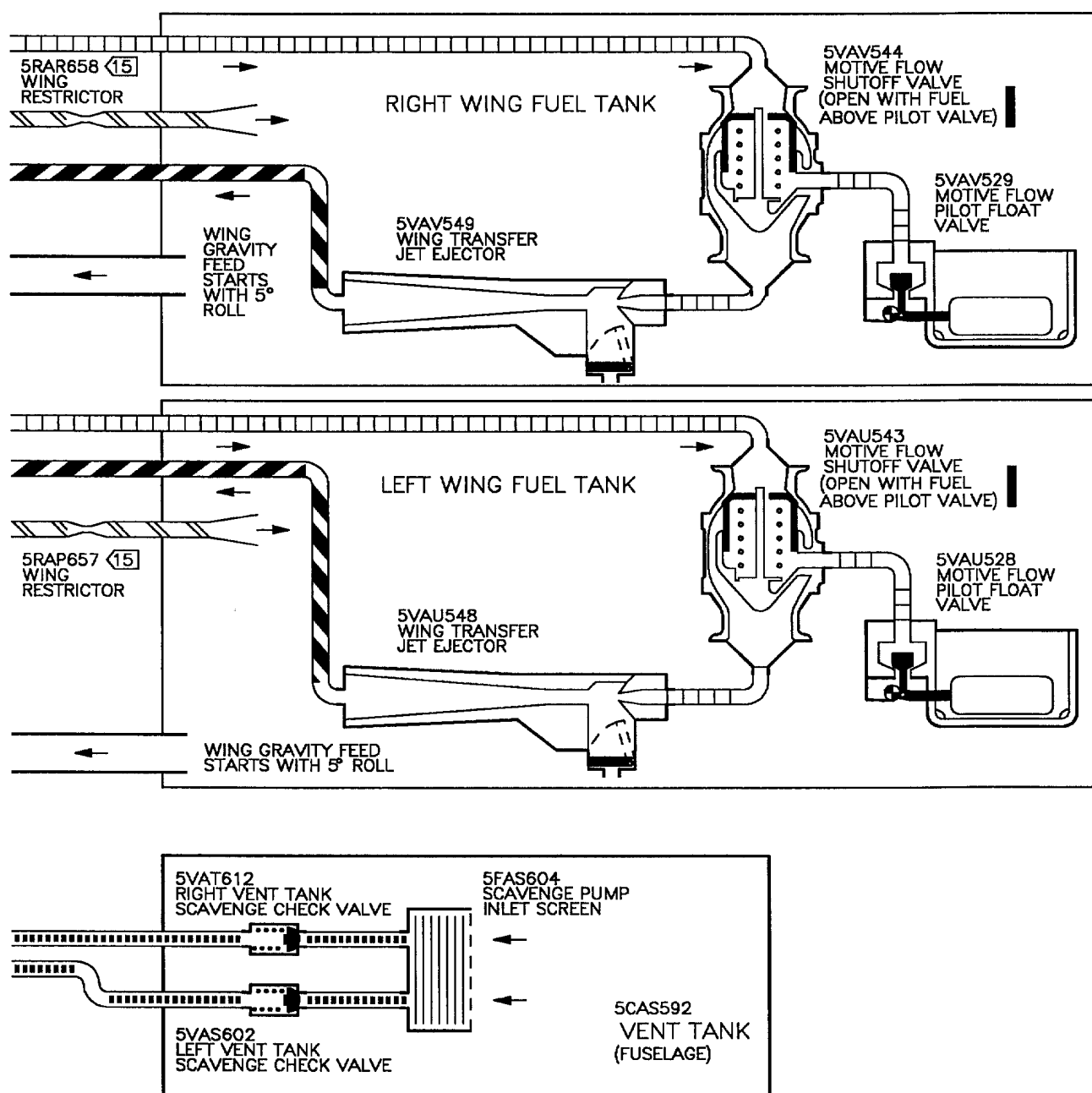
18AC-460-10-(30-11)22-CATI

Figure 1. Internal Fuel Transfer System Simplified Schematic - 161353 THRU 161519  
(Sheet 11)



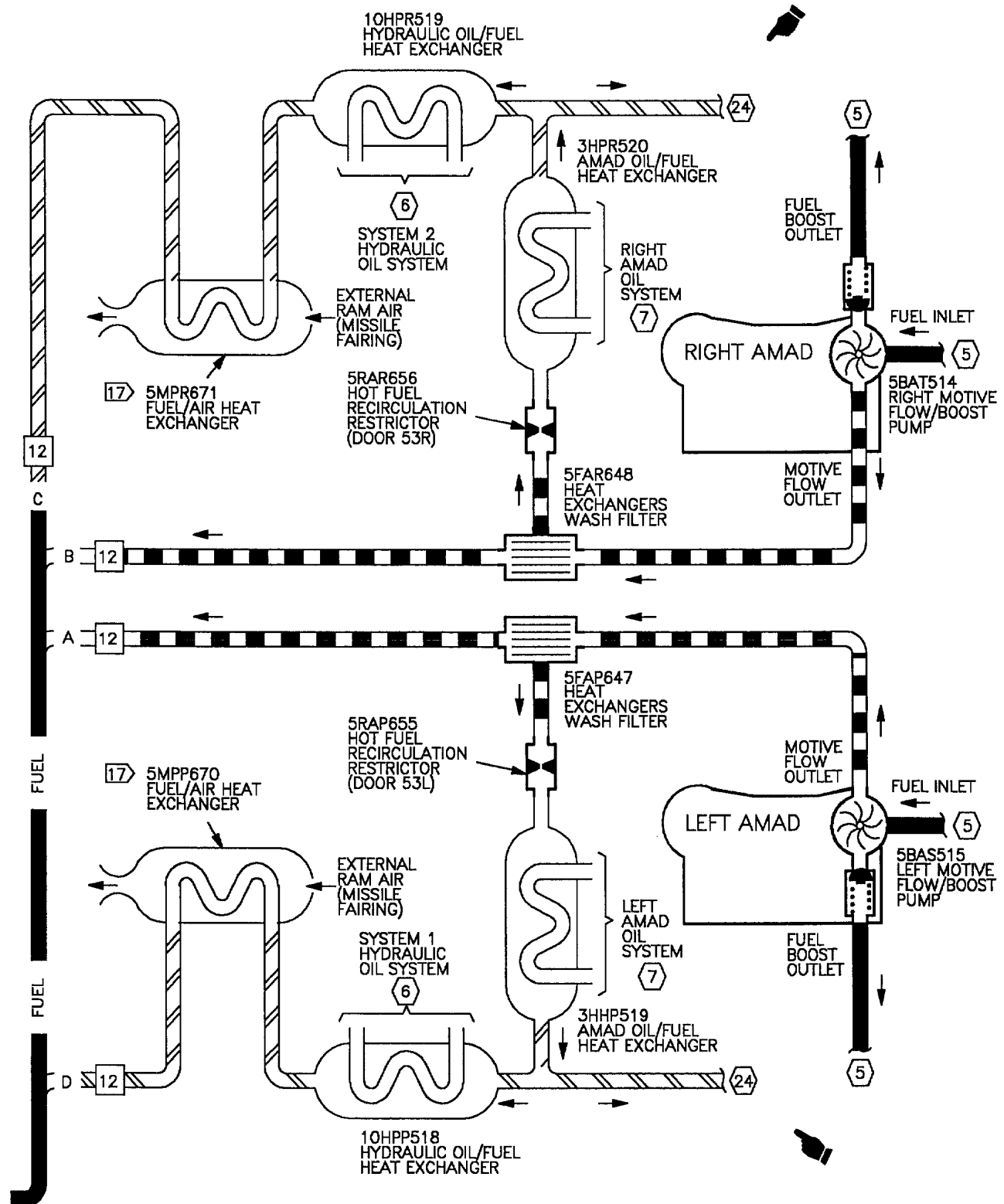
18AC-460-10-(30-12)22-CATI

Figure 1. Internal Fuel Transfer System Simplified Schematic - 161353 THRU 161519  
(Sheet 12)



18AC-460-10-(30-13)22-CAT1















Figure 1. Internal Fuel Transfer System Simplified Schematic - 161353 THRU 161519  
(Sheet 13)



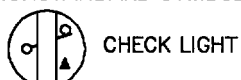
18AC-460-10-(30-14)22-CAT1

Figure 1. Internal Fuel Transfer System Simplified Schematic - 161353 THRU 161519  
(Sheet 14)
























## LEGEND

	FUEL		HIGHWAY FOR MULTIPLE FUEL PATTERNS TRANSFER		FUEL DUMP
			SCAVENGE		REFUEL
			TRANSFER MOTIVE FLOW		ENGINE FUEL FEED
			MOTIVE FLOW		HOT FUEL RECIRCULATION
					VENT

## 1. NONSTANDARD SYMBOLS:

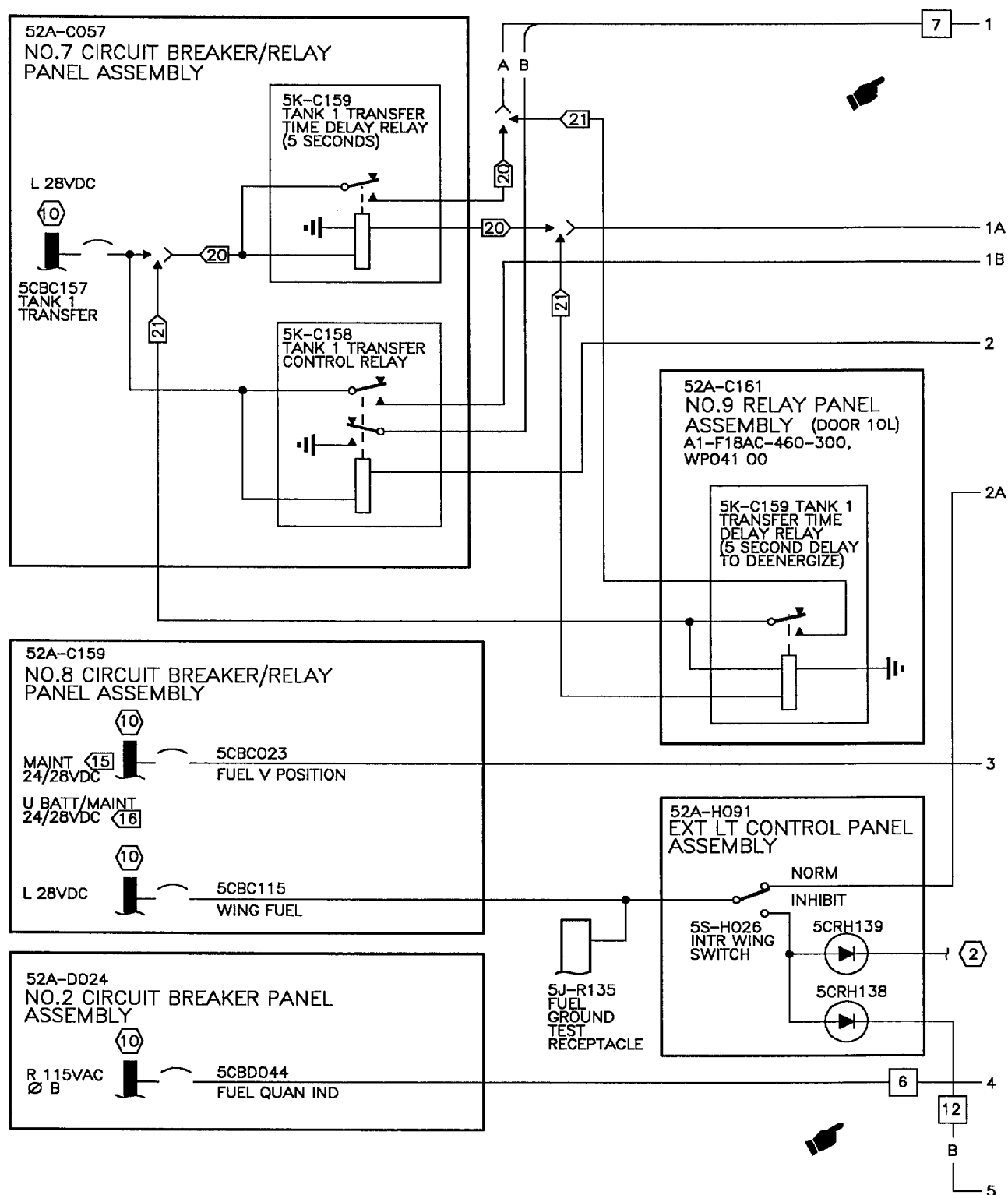


CHECK LIGHT

-  2 REFUEL/DEFUEL SYSTEM SIMPLIFIED SCHEMATIC, WP007 00.
-  3 FUEL PRESSURIZATION AND VENT SYSTEM SIMPLIFIED SCHEMATIC, WP020 00.
-  4 FUEL DUMP SYSTEM SIMPLIFIED SCHEMATIC, WP017 02.
-  5 ENGINE FUEL SUPPLY SYSTEM SIMPLIFIED SCHEMATIC, WP016 00.
-  6 HYDRAULIC SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-450-100, WP003 00.
-  7 AMAD SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-240-100, WP006 00.
-  8 FUEL QUANTITY LOW LEVEL WARNING SYSTEM SIMPLIFIED SCHEMATIC, WP023 02.
-  9 EXTERNAL FUEL SYSTEM SIMPLIFIED SCHEMATIC, WP011 00.
-  10 MOTIVE FLOW LINE NORMALLY PLUGGED. MOTIVE FLOW LINE CONNECTED DURING INTERNAL FUEL TRANSFER AND ENGINE FUEL SUPPLY SYSTEM TEST.
-  11 F/A-18A.
-  12 F/A-18B.
-  13 POWER DISTRIBUTION SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-420-100, WP005 00.
-  14 AFTER F18 AFC 53 FUEL TRANSFER PRECHECK VALVE IS REMOVED FROM SYSTEM AND LINE FROM FUEL LEVEL CONTROL SELECTOR VALVE IS CAPPED OFF AT TANK ENTRANCE.
-  15 BEFORE F/A-18 AFC 18.
-  16 AFTER F/A-18 AFC 18.
-  17 AFTER F/A-18 AFC 21.
-  18 BEFORE F/A-18 AFC 48.
-  19 AFTER F/A-18 AFC 48.
-  20 BEFORE F/A-18 AFC 39 AND 53.
-  21 AFTER F/A-18 AFC 53.
-  22 AFTER F/A-18 AFC 39.
-  23 AFTER F/A-18 AFC 39 AND 53.
-  24 HOT FUEL RECIRCULATION SYSTEM SIMPLIFIED SCHEMATIC, WP018 02.

18AC-460-10-(30-15)22-CAT1

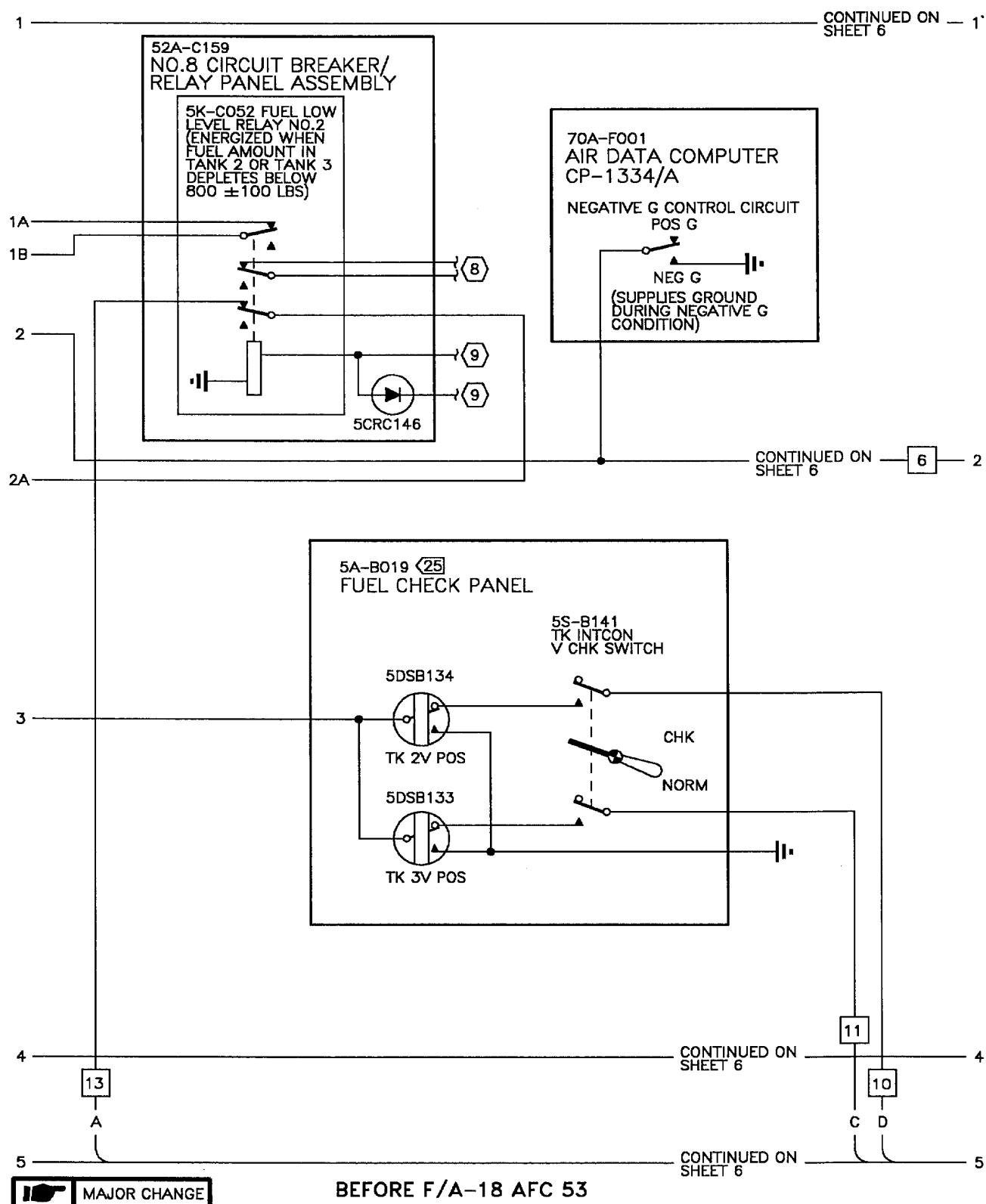
Figure 1. Internal Fuel Transfer System Simplified Schematic - 161353 THRU 161519  
(Sheet 15)



BEFORE F/A-18 AFC 53

18AC-460-10-(36-1)22-CAT1

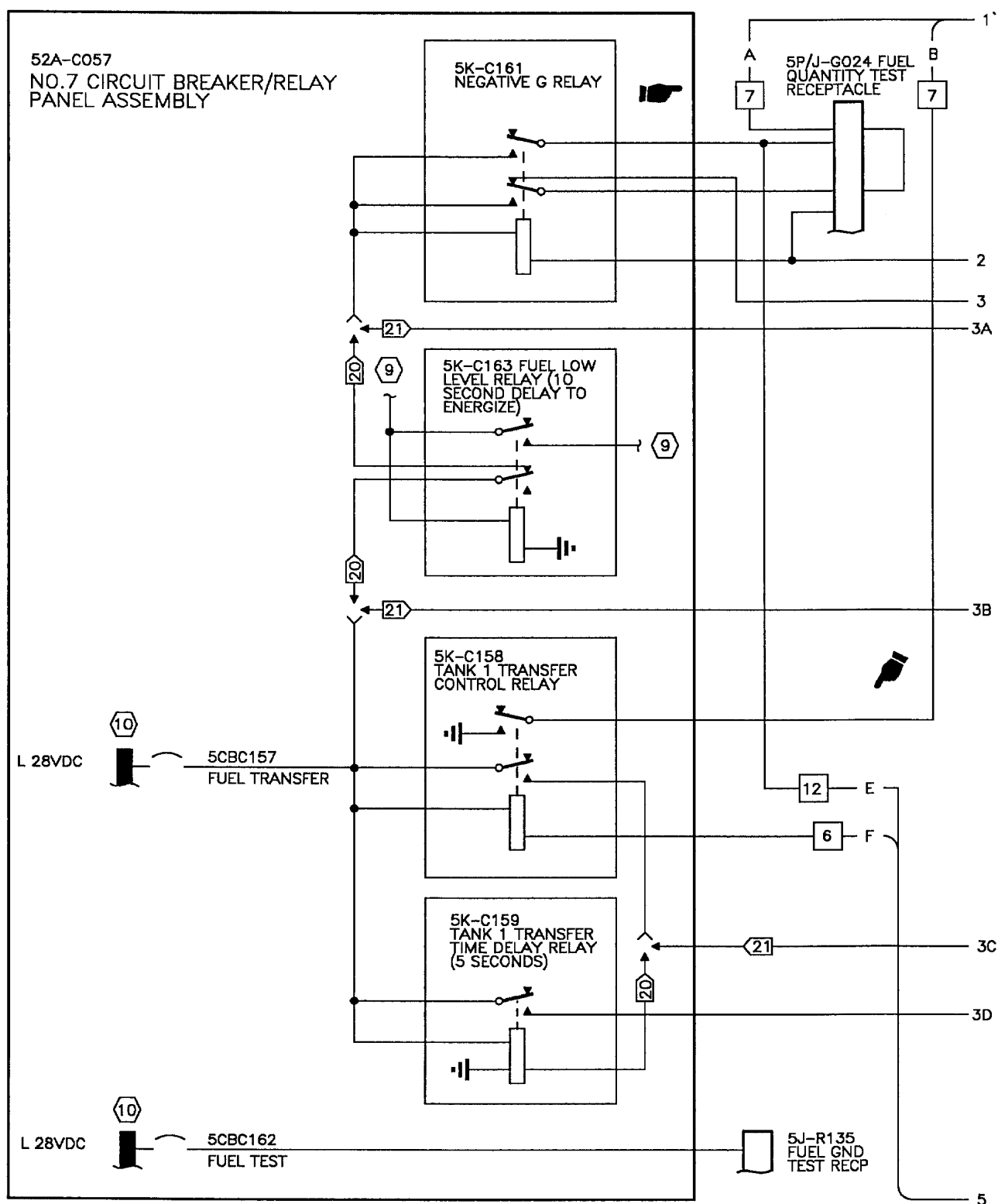
**Figure 2. Internal Fuel Transfer System Simplified Schematic - 161520 THRU 161761  
(Sheet 1)**



18AC-460-10-(36-2)22-CAT1

**Figure 2. Internal Fuel Transfer System Simplified Schematic - 161520 THRU 161761  
(Sheet 2)**

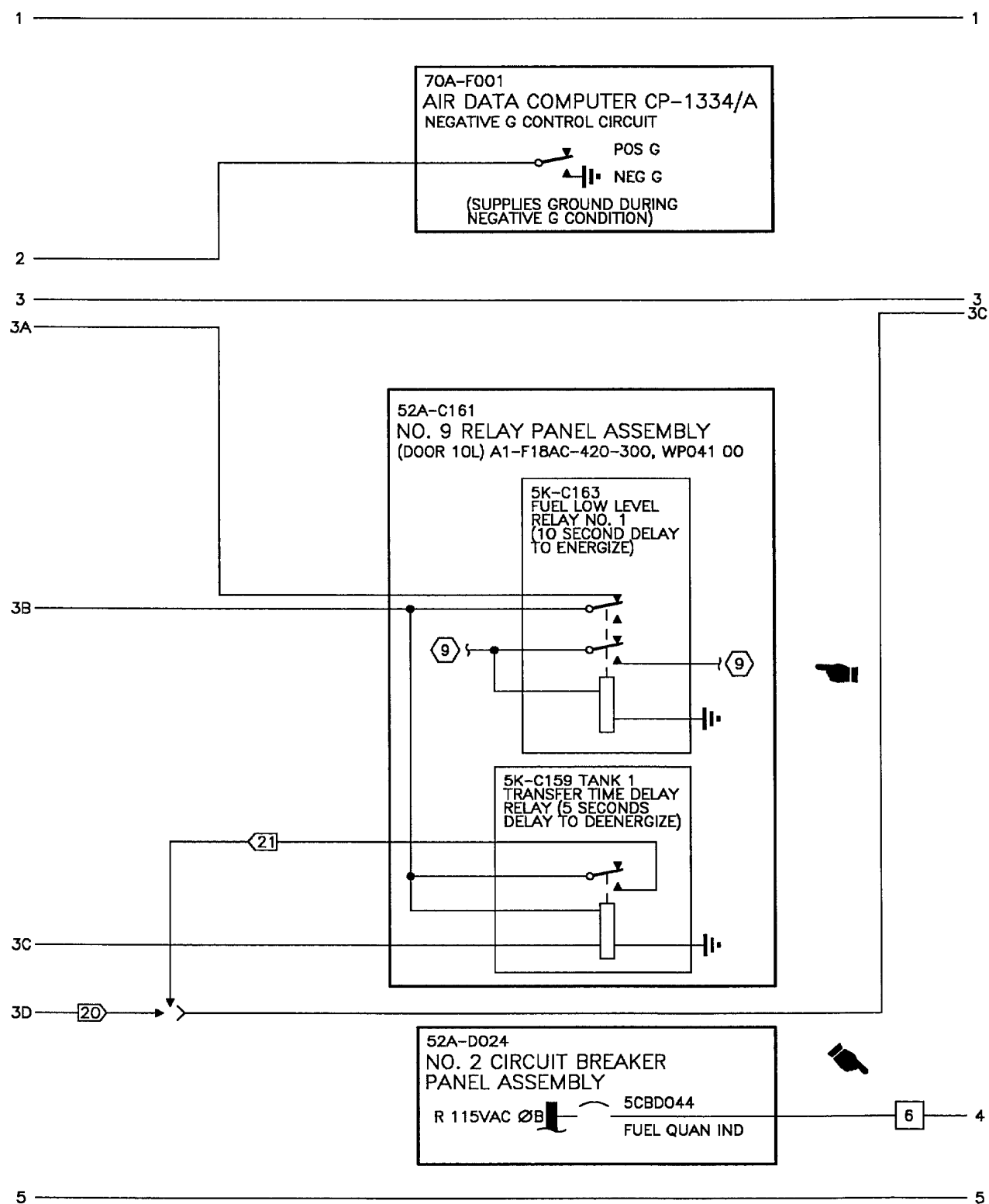




AFTER F/A-18 AFC 53

18AC-460-10-(36-3)22-CAT1

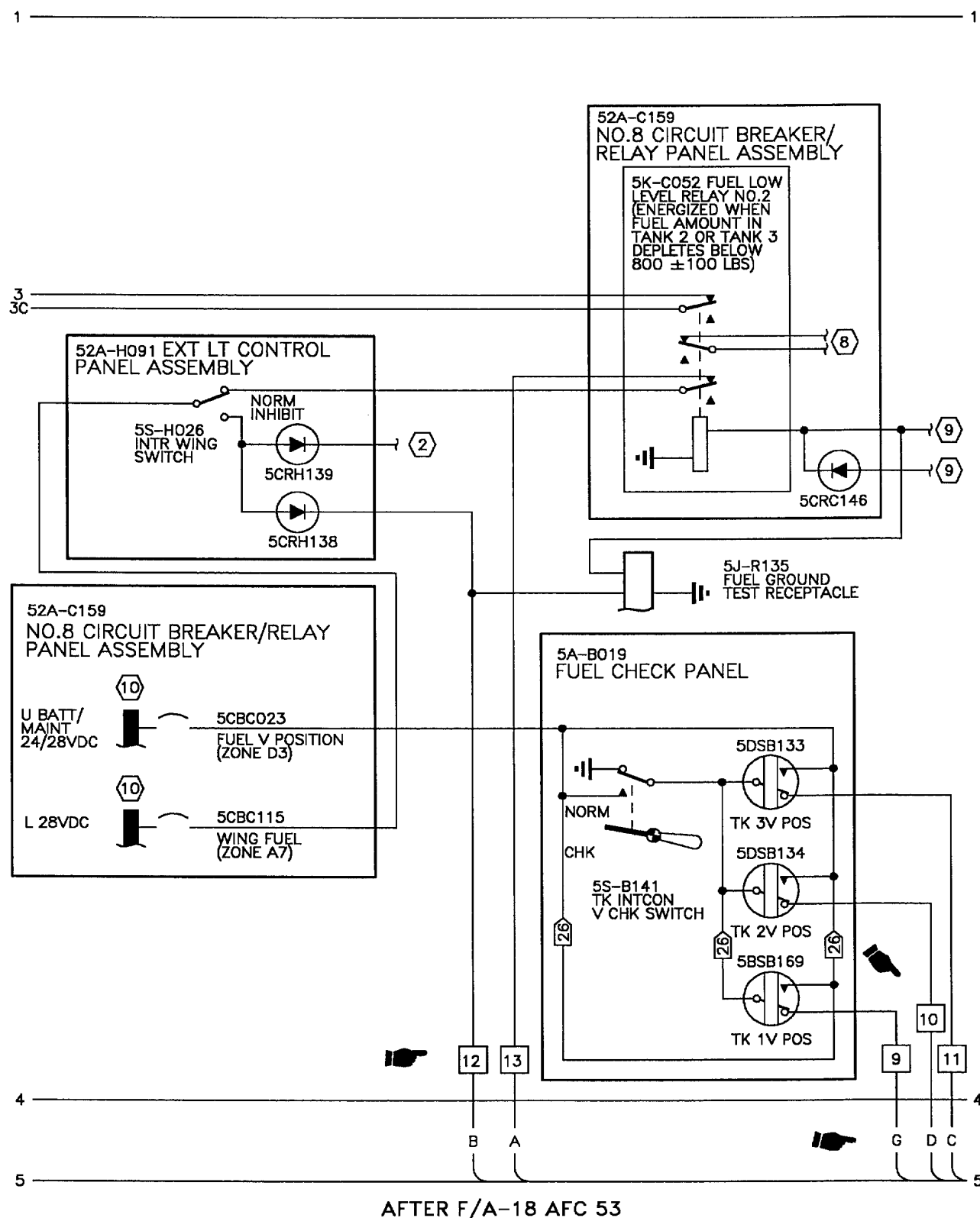
Figure 2. Internal Fuel Transfer System Simplified Schematic - 161520 THRU 161761  
(Sheet 3)



AFTER F/A-18 AFC 53

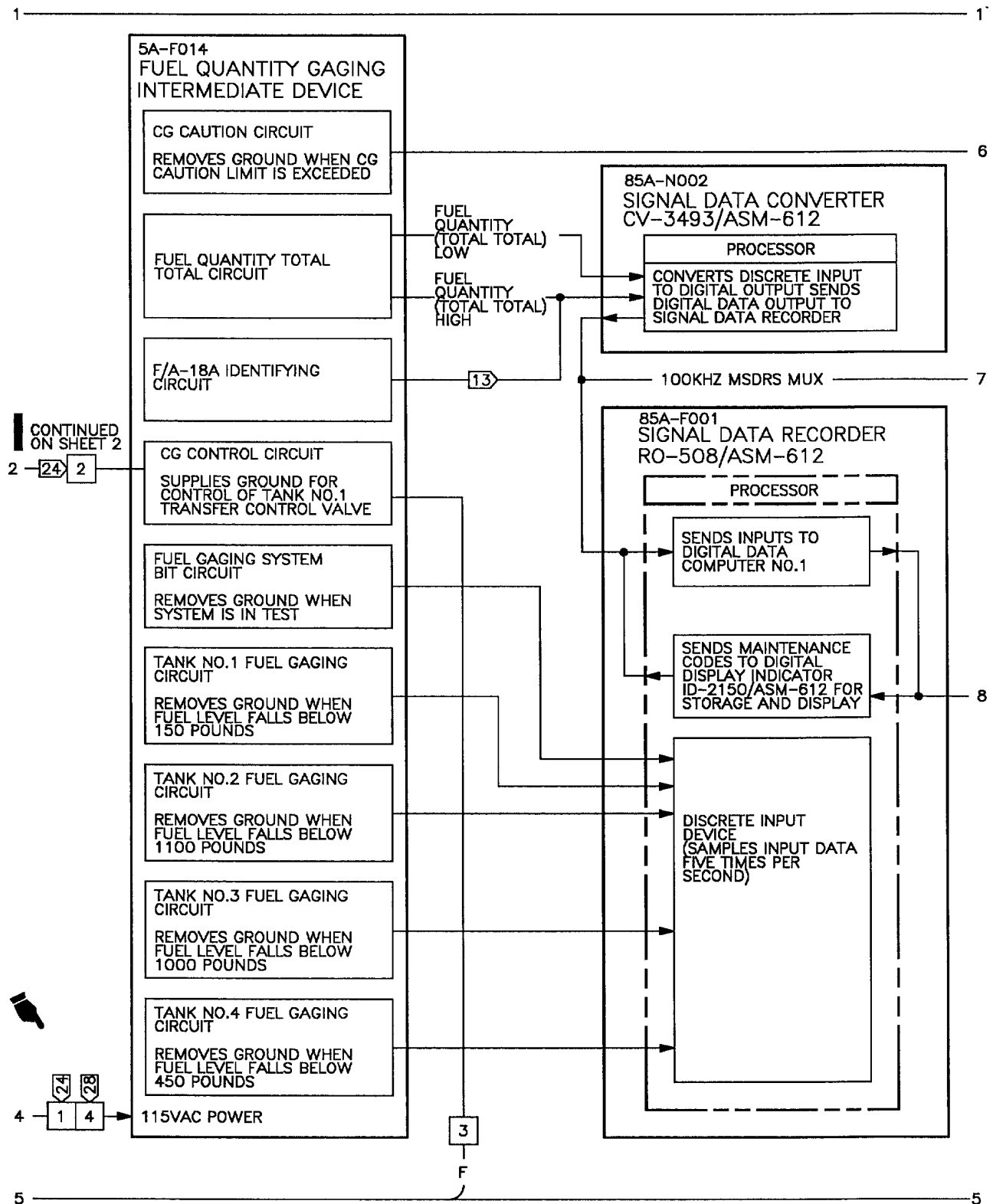
18AC-460-10-(36-4)22-CATI

**Figure 2. Internal Fuel Transfer System Simplified Schematic - 161520 THRU 161761  
(Sheet 4)**



18AC-460-10-(36-5)22-CAT1

Figure 2. Internal Fuel Transfer System Simplified Schematic - 161520 THRU 161761 (Sheet 5)



18AC-460-10-(36-6)22-CATI

Figure 2. Internal Fuel Transfer System Simplified Schematic - 161520 THRU 161761  
(Sheet 6)

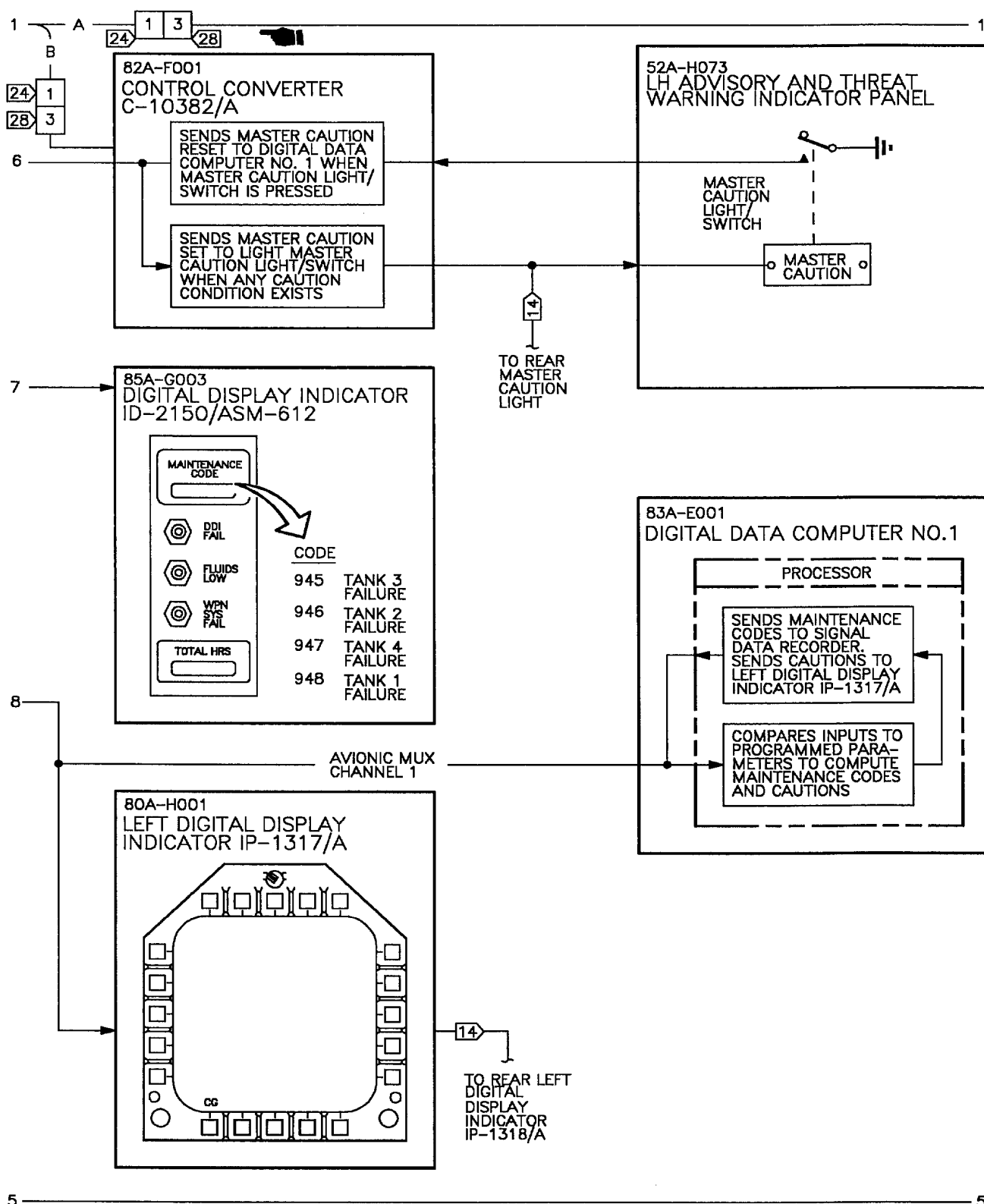
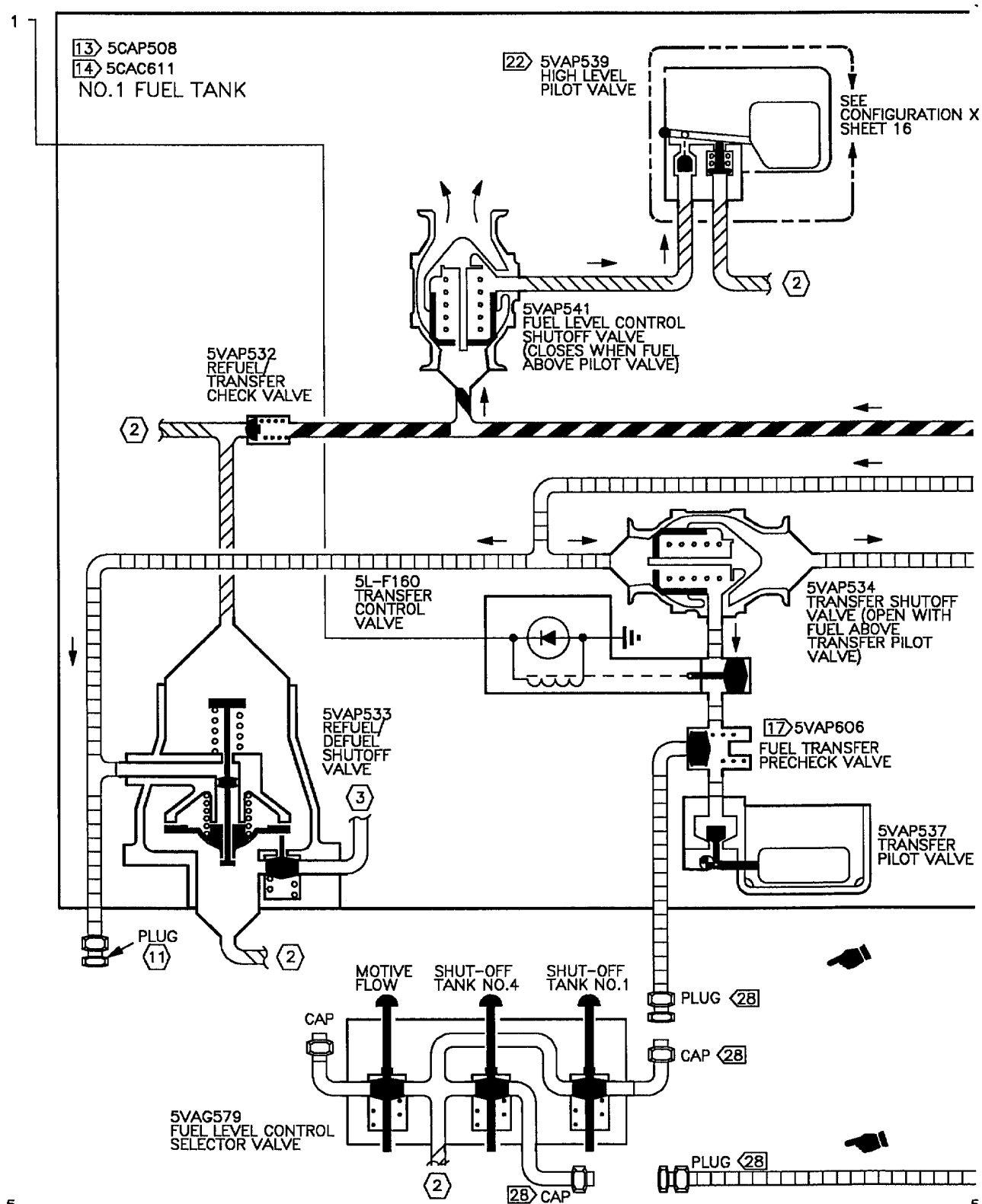
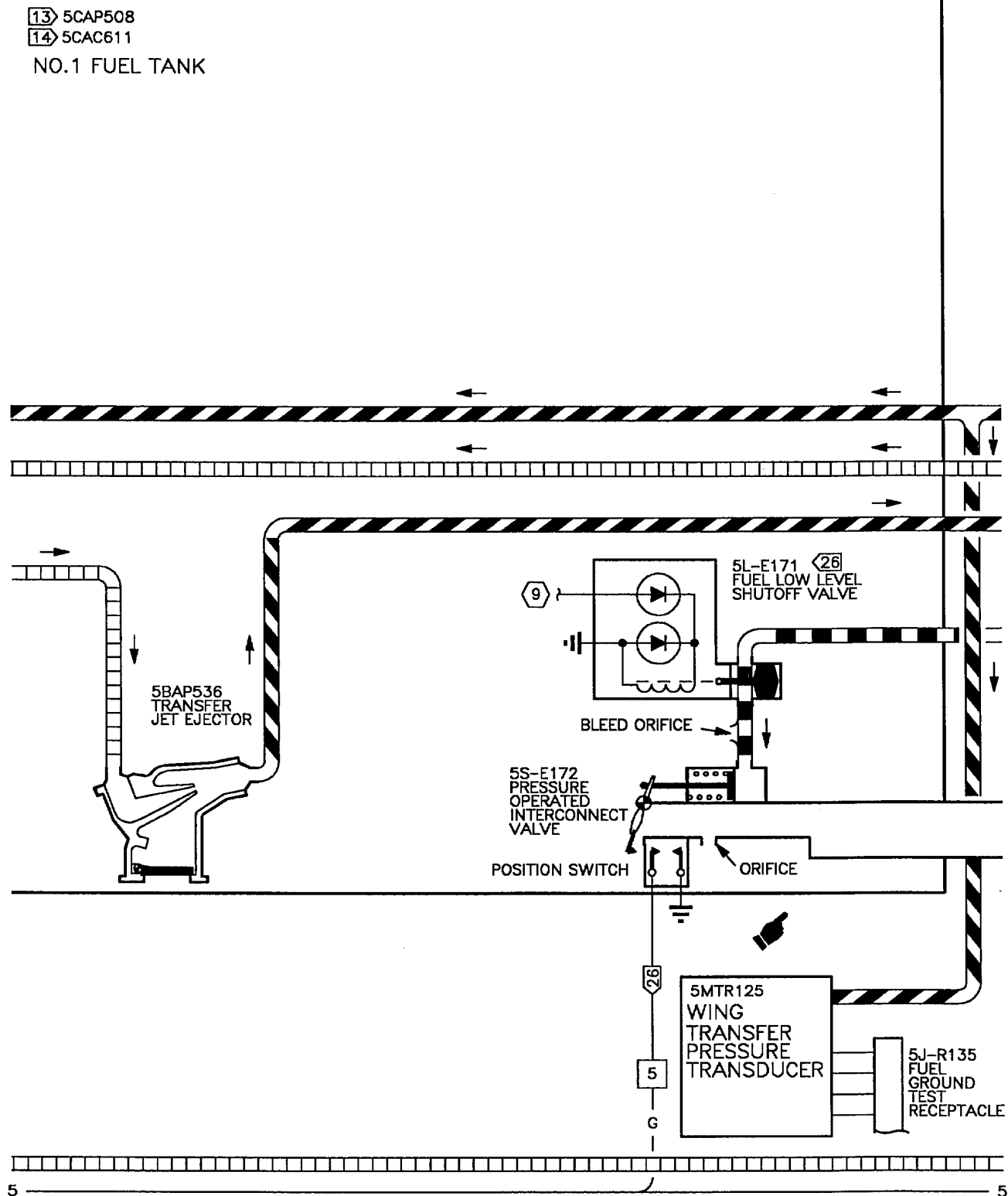


Figure 2. Internal Fuel Transfer System Simplified Schematic - 161520 THRU 161761  
(Sheet 7)

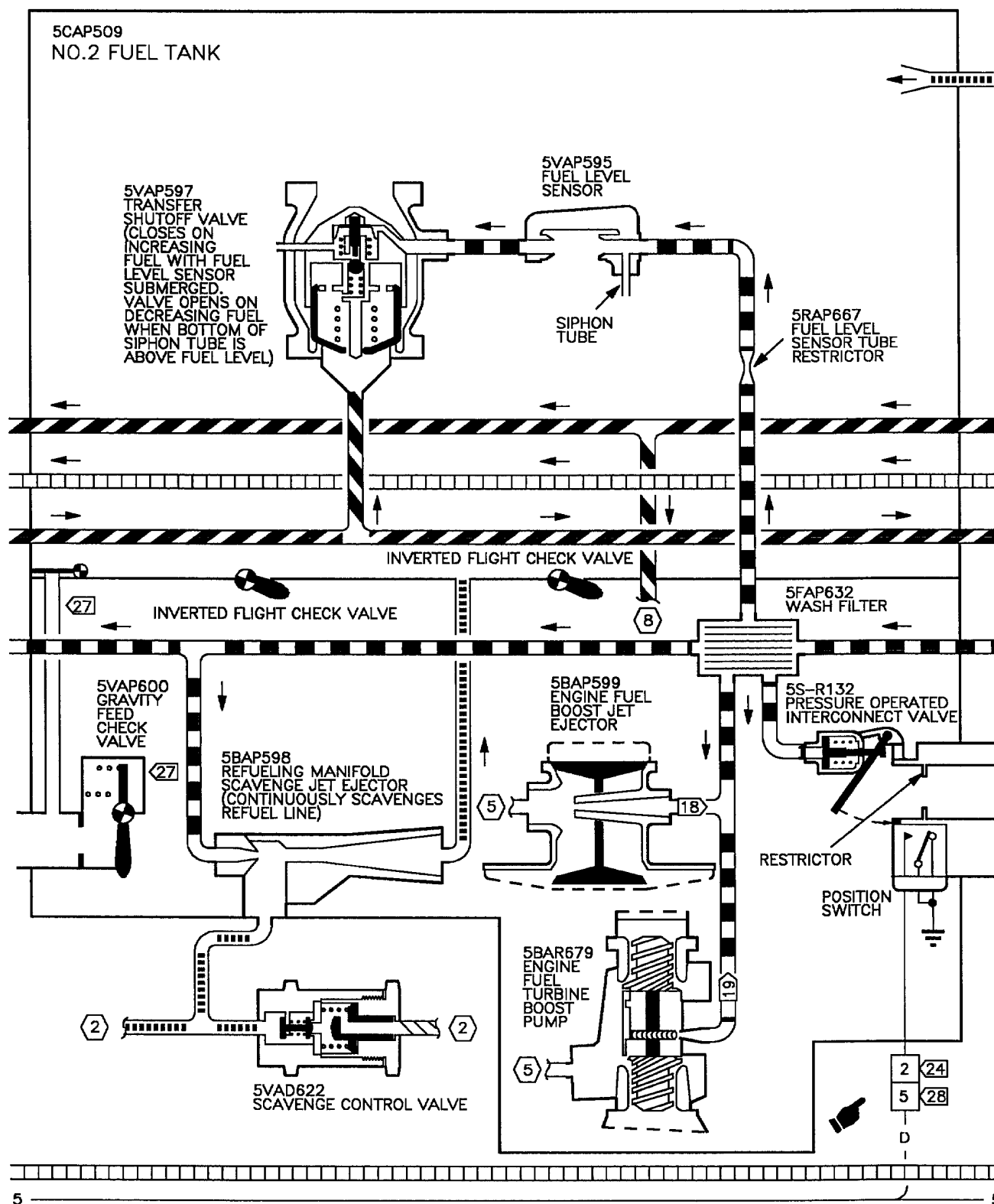


**Figure 2. Internal Fuel Transfer System Simplified Schematic - 161520 THRU 161761  
(Sheet 8)**



18AC-460-10-(36-9)22-CATI

Figure 2. Internal Fuel Transfer System Simplified Schematic - 161520 THRU 161761  
(Sheet 9)



18AC-460-10-(36-10)22-CAT1

Figure 2. Internal Fuel Transfer System Simplified Schematic - 161520 THRU 161761  
(Sheet 10)



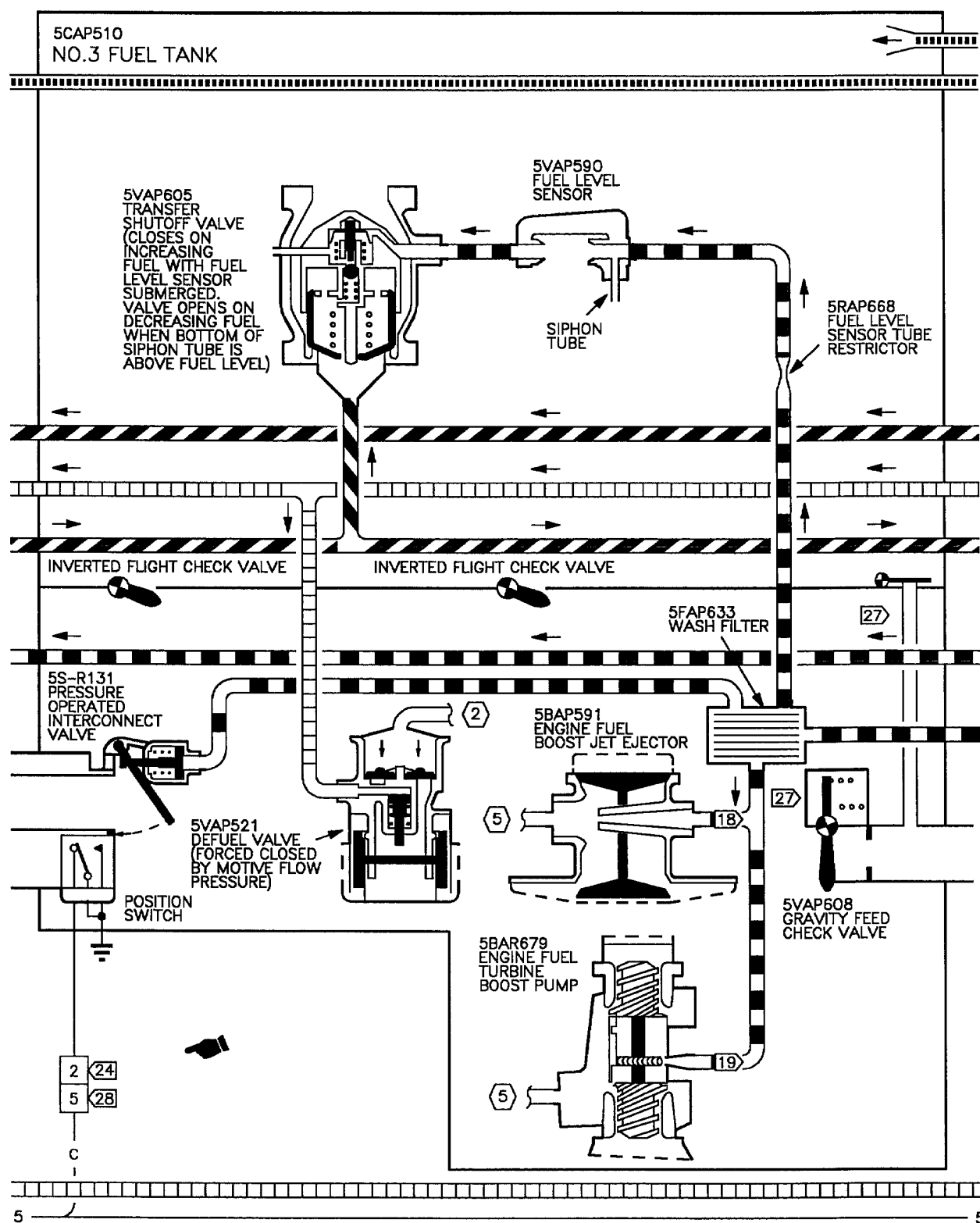


Figure 2. Internal Fuel Transfer System Simplified Schematic - 161520 THRU 161761  
(Sheet 11)

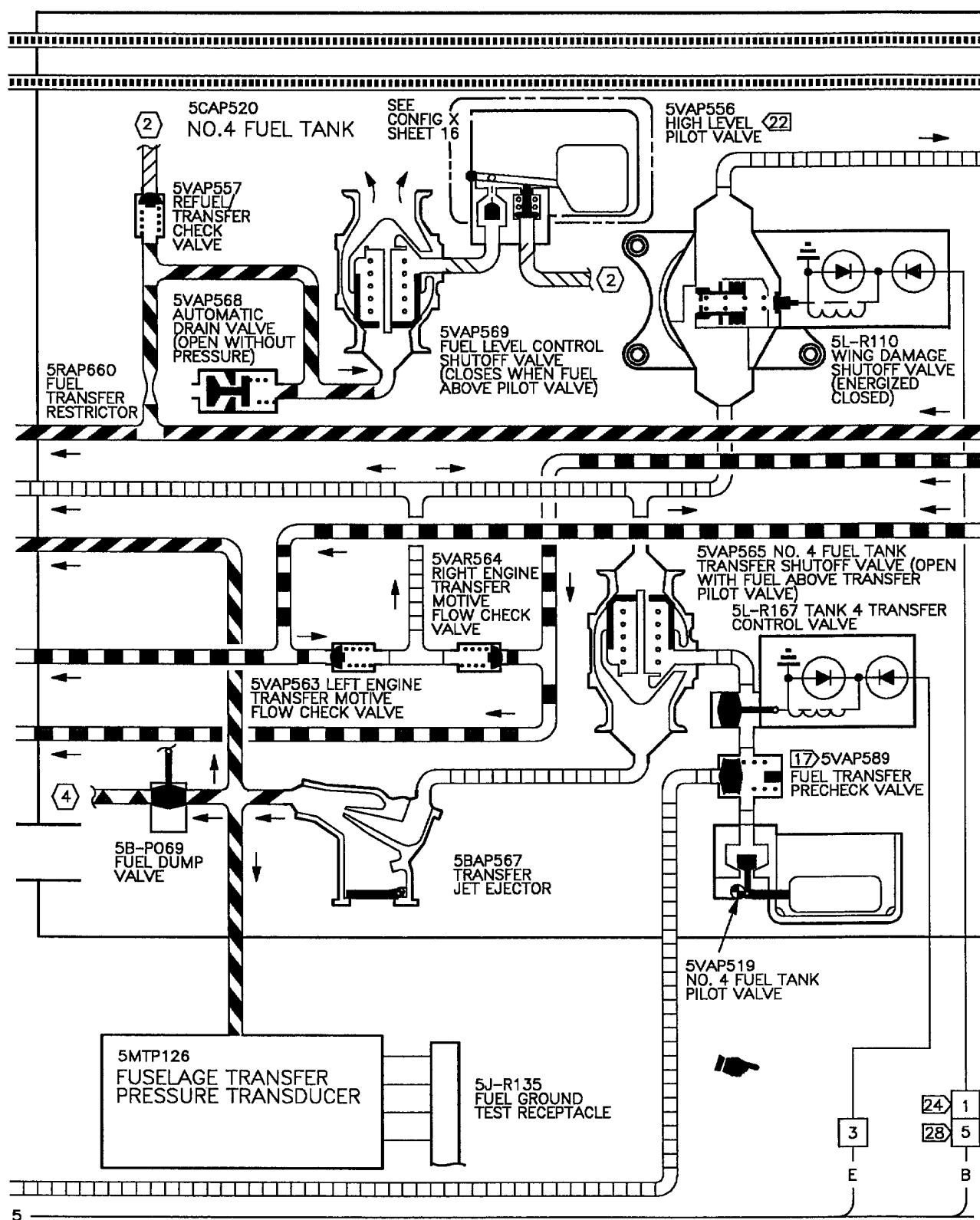
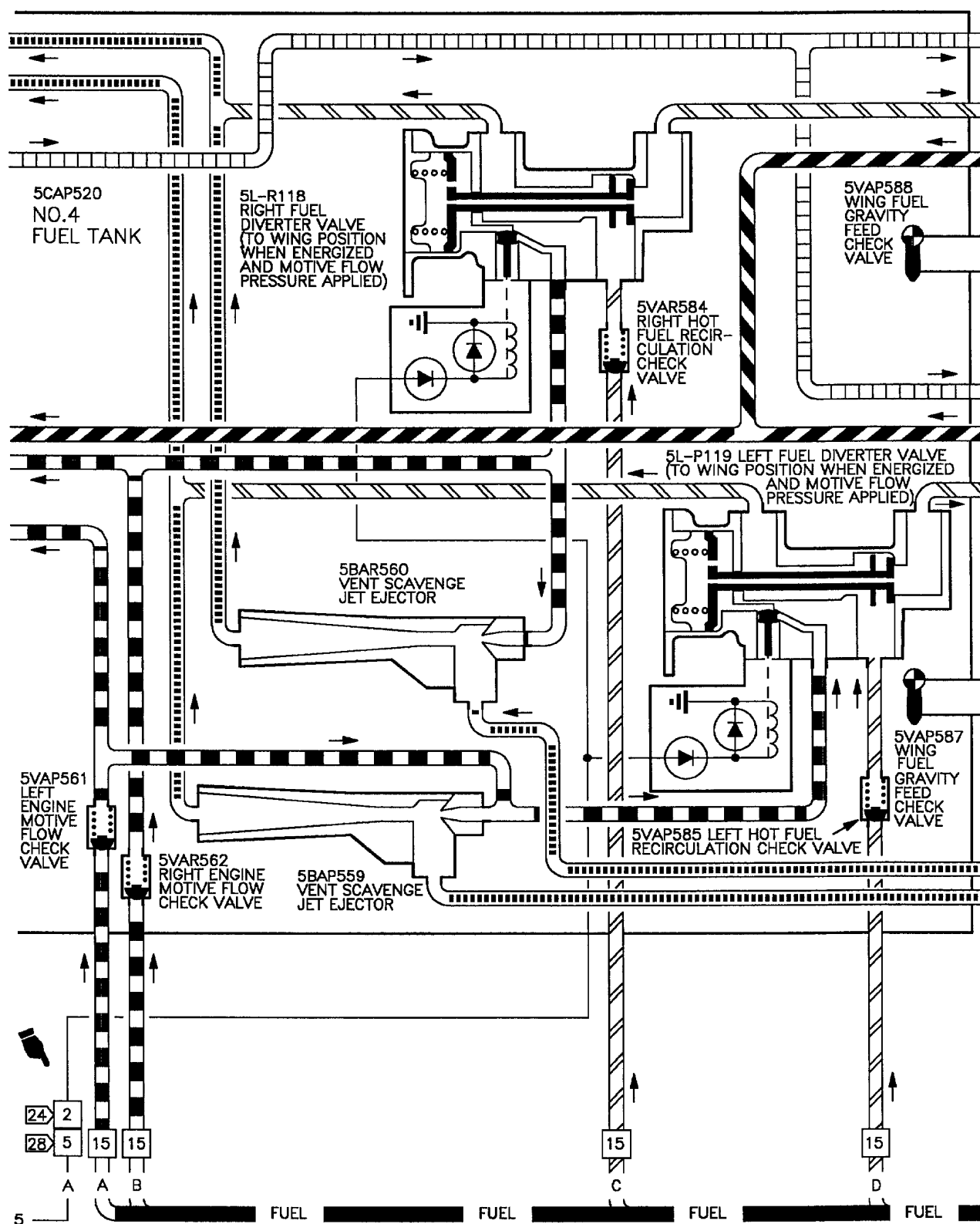


Figure 2. Internal Fuel Transfer System Simplified Schematic - 161520 THRU 161761  
(Sheet 12)



18AC-460-10-(36-13)22-CAT1

Figure 2. Internal Fuel Transfer System Simplified Schematic - 161520 THRU 161761  
(Sheet 13)

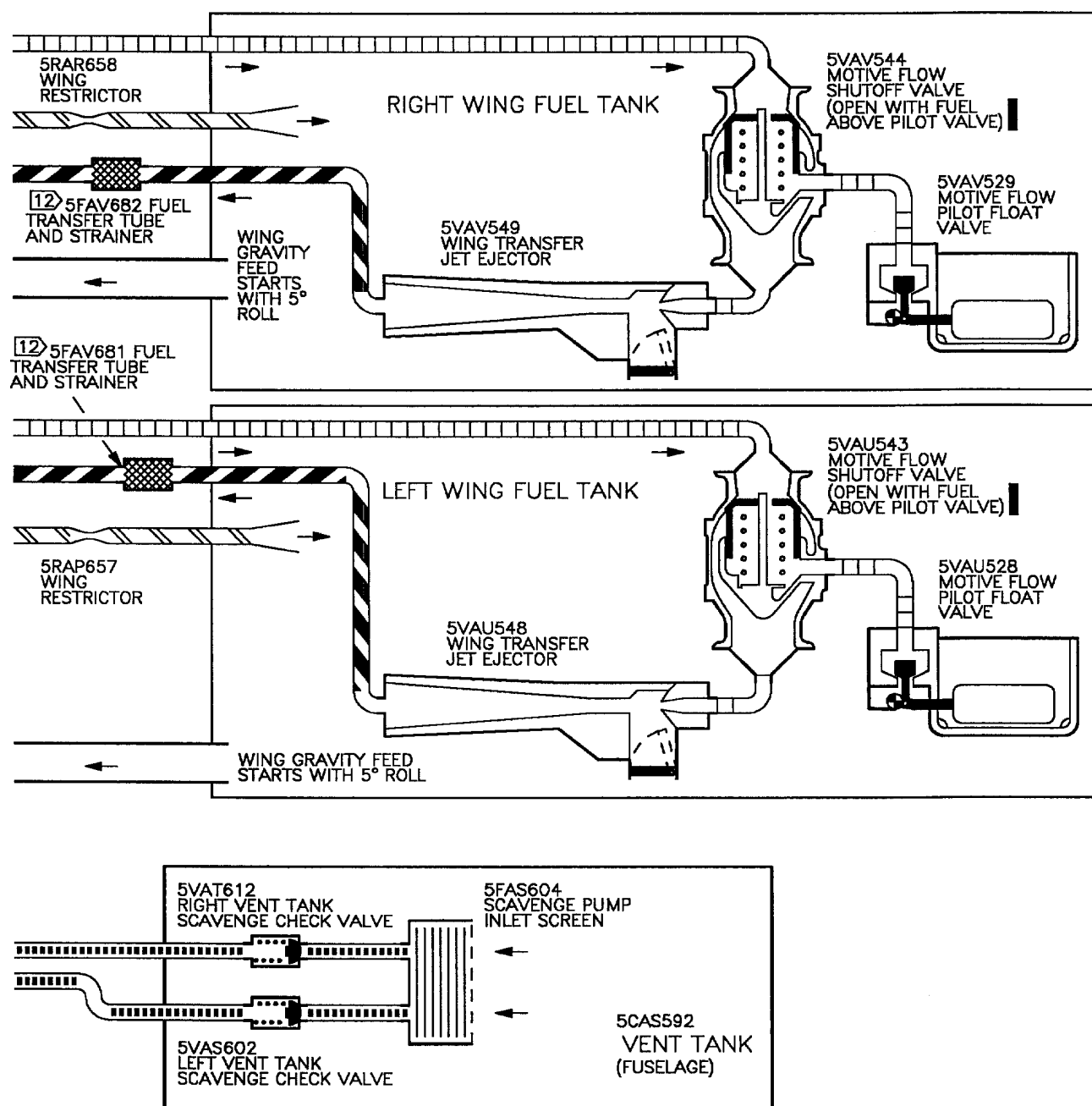
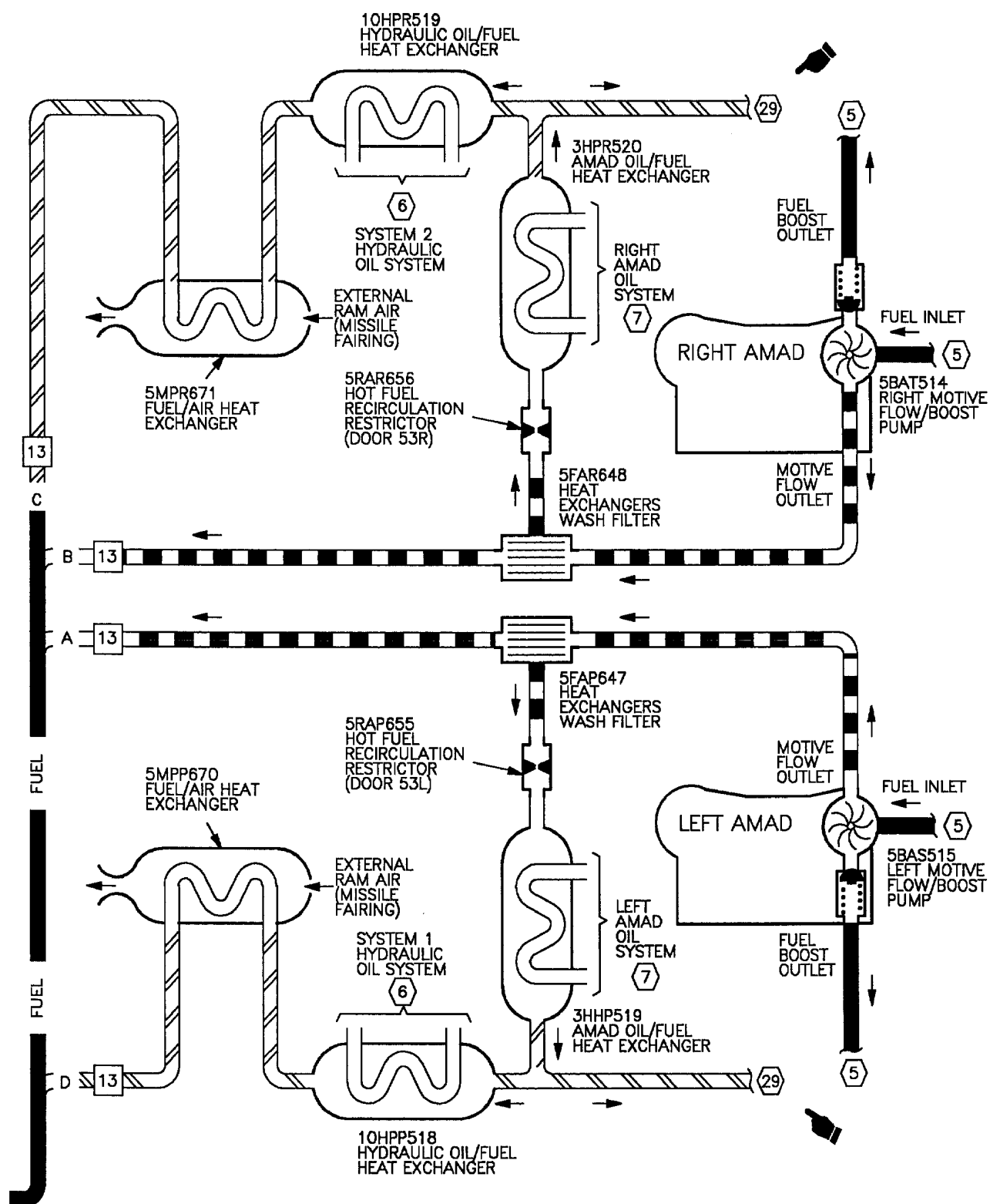













Figure 2. Internal Fuel Transfer System Simplified Schematic - 161520 THRU 161761  
(Sheet 14)



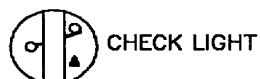
18AC-460-10-(36-15)22-CATI

Figure 2. Internal Fuel Transfer System Simplified Schematic - 161520 THRU 161761  
(Sheet 15)

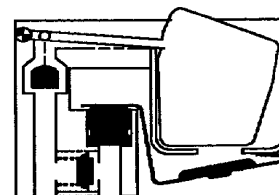
## LEGEND

	FUEL		HIGHWAY FOR MULTIPLE FUEL PATTERNS		FUEL DUMP
	TRANSFER		REFUEL		ENGINE FUEL FEED
	SCAVENGE		HOT FUEL RECIRCULATION		VENT
	TRANSFER MOTIVE FLOW				
	MOTIVE FLOW				

## 1. NONSTANDARD SYMBOLS:



- 2** REFUEL/DEFUEL SYSTEM SIMPLIFIED SCHEMATIC, WPO07 00.
- 3** FUEL PRESSURIZATION AND VENT SYSTEM SIMPLIFIED SCHEMATIC, WPO20 00.
- 4** FUEL DUMP SYSTEM SIMPLIFIED SCHEMATIC, WPO17 02.
- 5** ENGINE FUEL SUPPLY SYSTEM SIMPLIFIED SCHEMATIC, WPO16 00.
- 6** HYDRAULIC SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-450-100, WPO03 00.
- 7** AMAD SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-240-100, WPO06 00.
- 8** EXTERNAL FUEL SYSTEM SIMPLIFIED SCHEMATIC, WPO11 00.
- 9** FUEL QUANTITY AND LOW LEVEL WARNING SYSTEM SIMPLIFIED SCHEMATIC, WPO23 02.
- 10** POWER DISTRIBUTION SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-420-100, WPO05 00.
- 11** MOTIVE FLOW LINE NORMALLY PLUGGED. MOTIVE FLOW LINE CONNECTED DURING INTERNAL FUEL TRANSFER AND ENGINE FUEL SUPPLY SYSTEM TEST.
- 12** 161735 THRU 161761.
- 13** F/A-18A.
- 14** F/A-18B.
- 15** 161520 THRU 161528.
- 16** 161702 THRU 161761.
- 17** AFTER F/A-18 AFC 53 FUEL TRANSFER PRECHECK VALVE IS REMOVE FROM SYSTEM AND LINE FROM FUEL LEVEL CONTROL SELECTOR VALVE IS CAPPED OFF AT TANK ENTRANCE.
- 18** BEFORE F/A-18 AFC 18.
- 19** AFTER F/A-18 AFC 18.
- 20** BEFORE F/A-18 AFC 48.
- 21** AFTER F/A-18 AFC 48.
- 22** 2800095 HIGH LEVEL PILOT VALVE.
- 23** 2800018 HIGH LEVEL PILOT VALVE.
- 24** BEFORE F/A-18 AFC 53.
- 25** BEFORE F/A-18 AFC 39.
- 26** AFTER F/A-18 AFC 39.
- 27** 161716 AND UP; ALSO 161353 THRU 161715 AFTER F/A-18 AFC 53.
- 28** AFTER F/A-18 AFC 53.
- 29** HOT FUEL RECIRCULATION SYSTEM SIMPLIFIED SCHEMATIC, WPO18 02.



**23** HIGH LEVEL PILOT VALVE  
CONFIGURATION X

18AC-460-10-(36-16)22-CATI

**Figure 2. Internal Fuel Transfer System Simplified Schematic - 161520 THRU 161761  
(Sheet 16)**

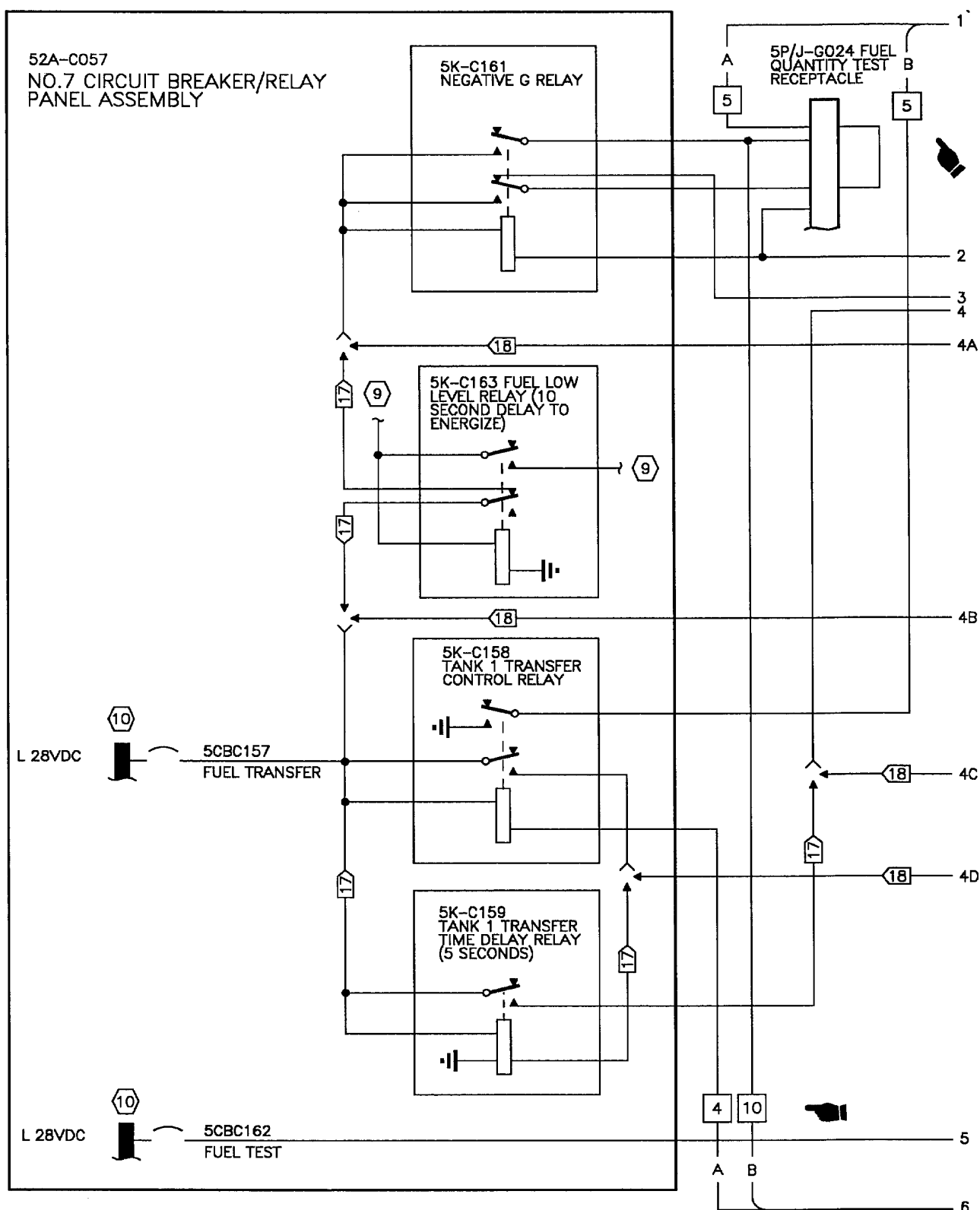
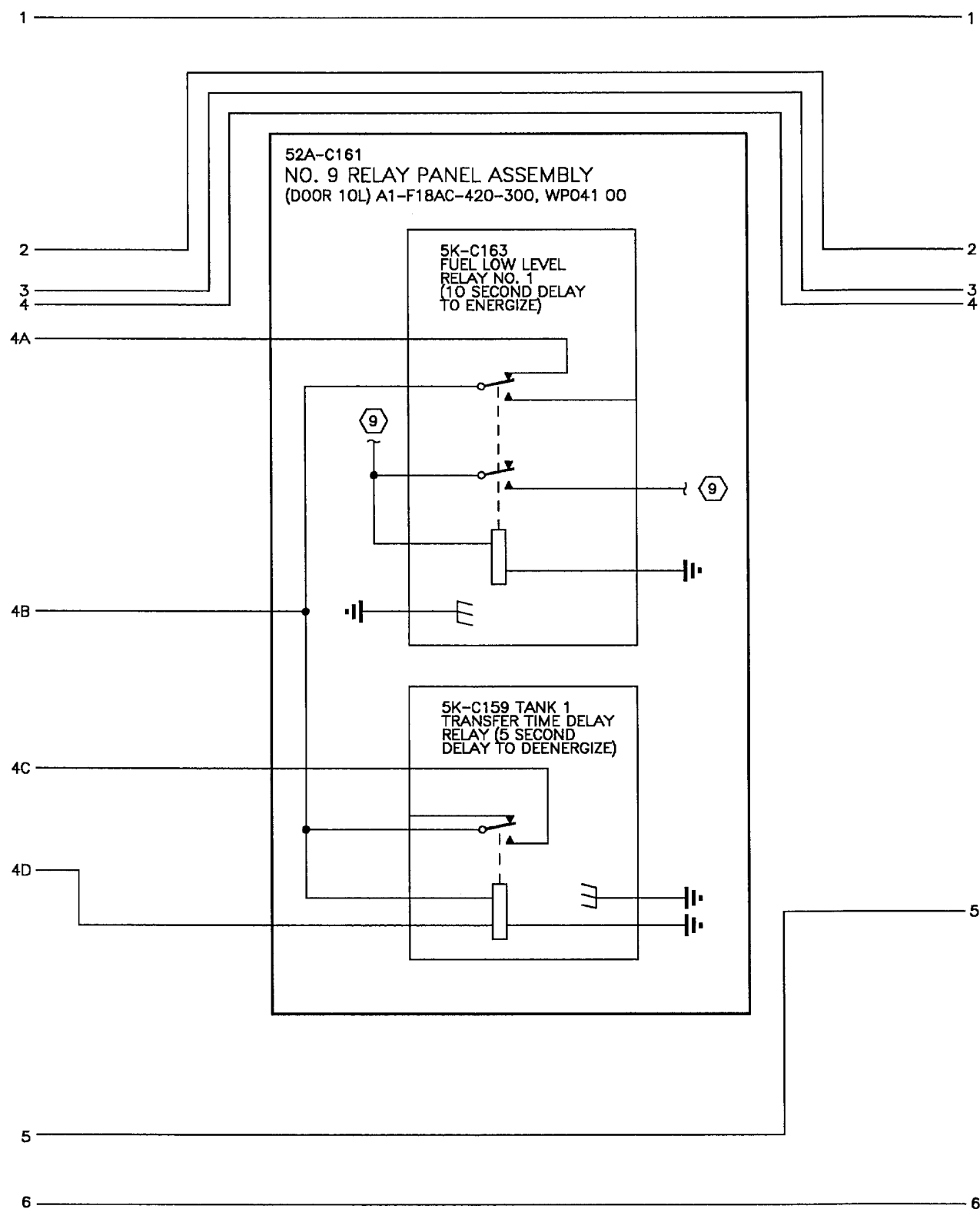


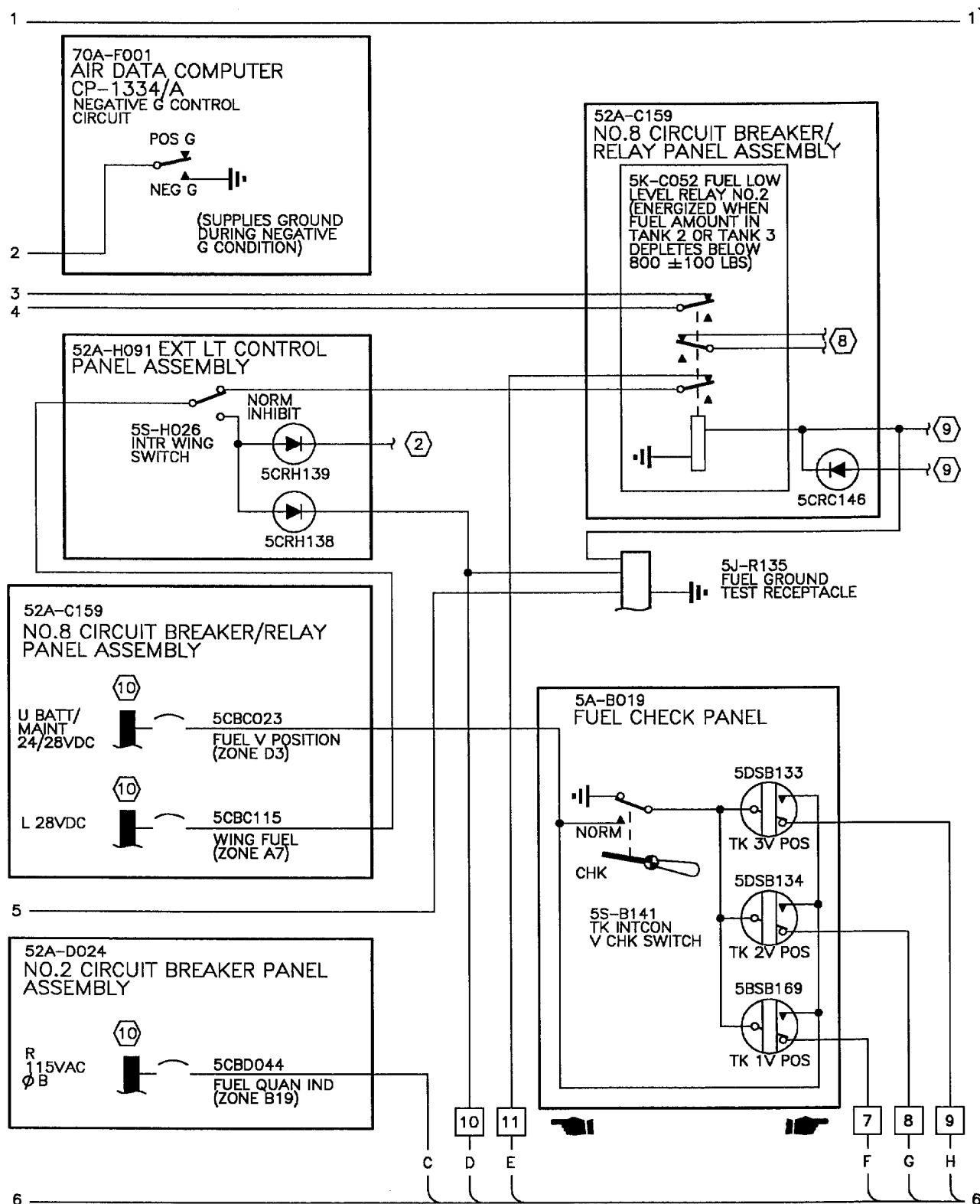
Figure 3. Internal Fuel Transfer System Simplified Schematic - 161924 THRU 161987  
(Sheet 1)



18AC-460-10-(37-1.1)19-CATI

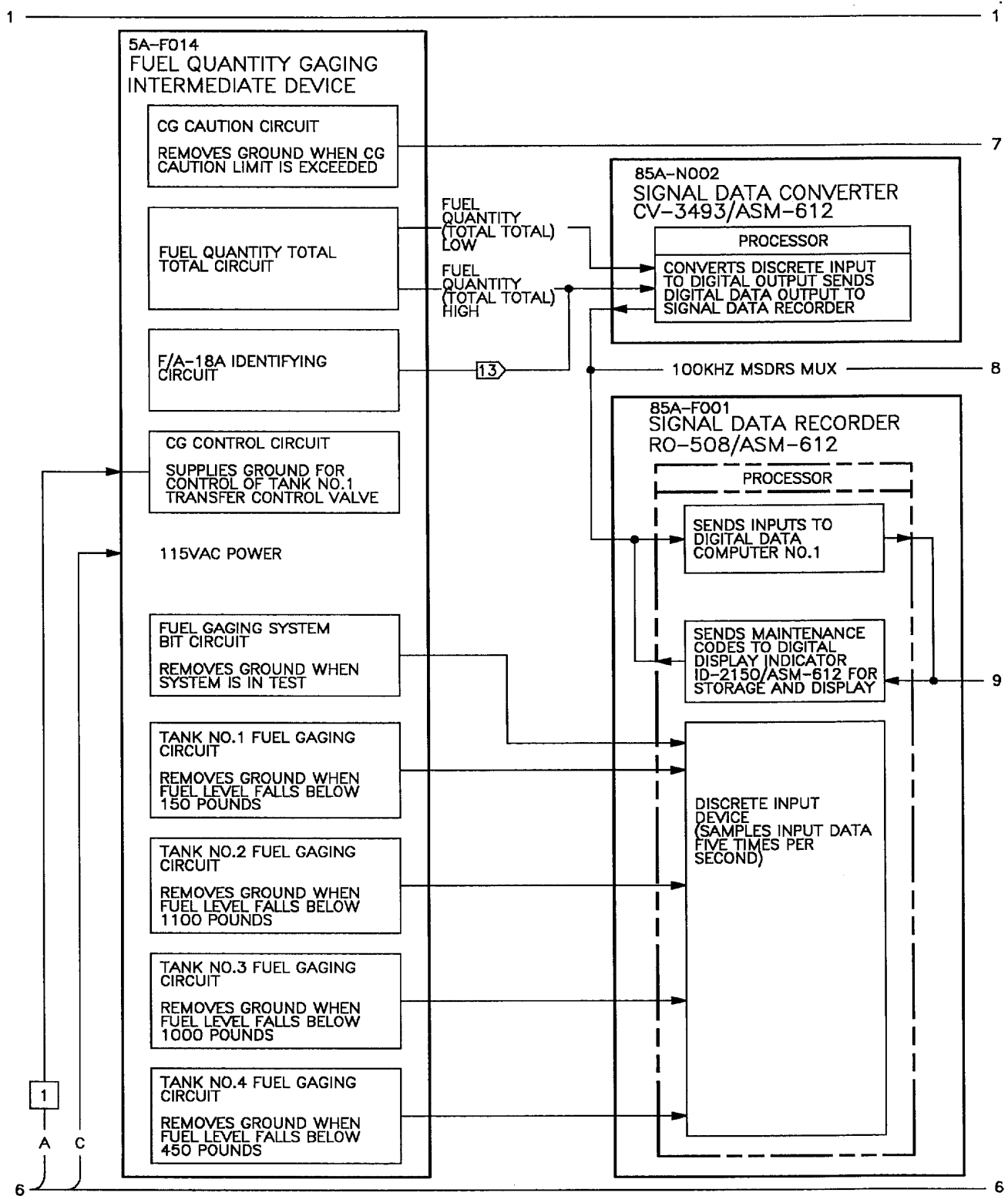
Figure 3. Internal Fuel Transfer System Simplified Schematic - 161924 THRU 161987  
(Sheet 2)





18AC-460-10-(37-2)22-CAT1

Figure 3. Internal Fuel Transfer System Simplified Schematic - 161924 THRU 161987  
(Sheet 3)



18AC-460-10-(37-3)22-CATI

**Figure 3. Internal Fuel Transfer System Simplified Schematic - 161924 THRU 161987 (Sheet 4)**

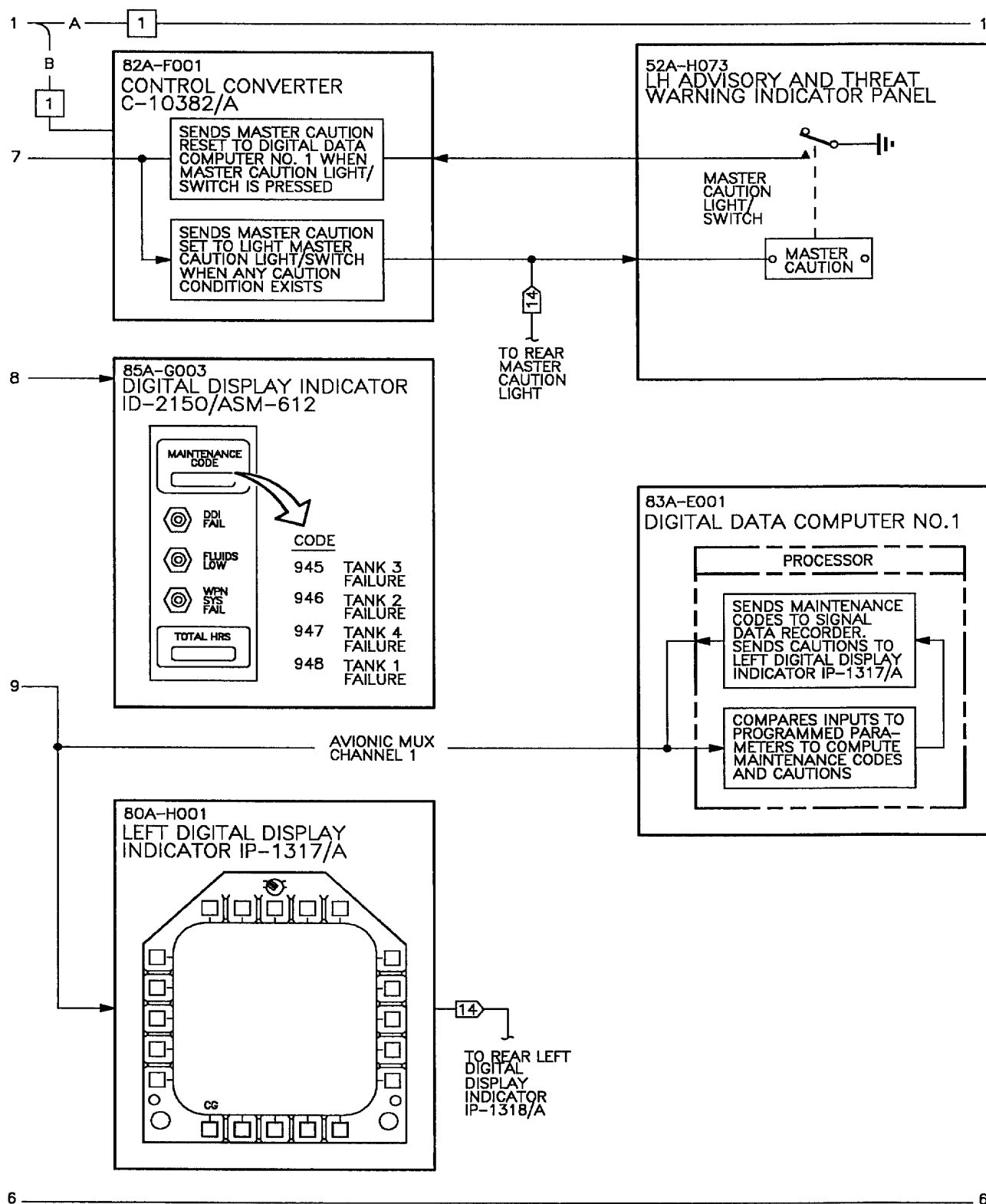
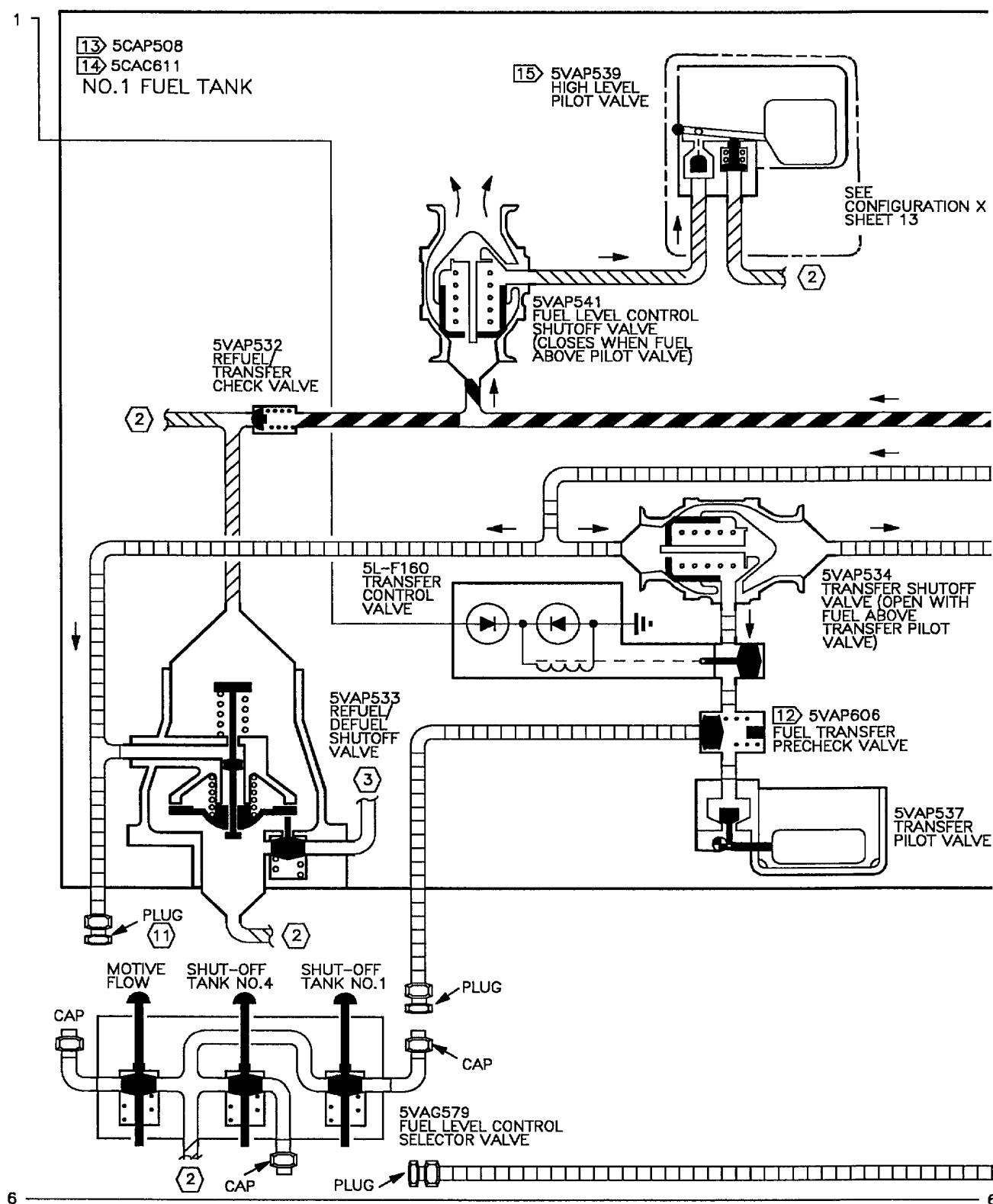


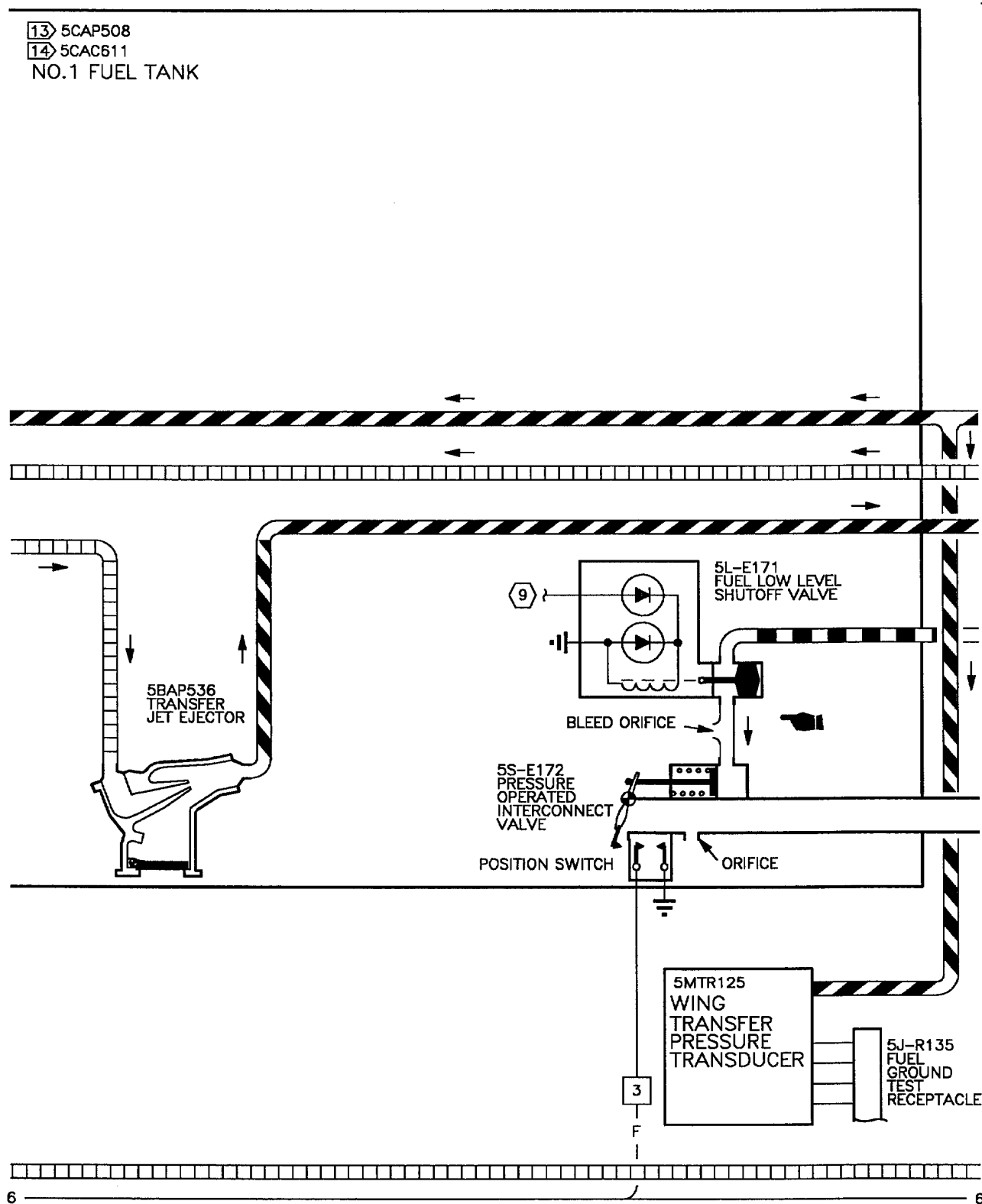
Figure 3. Internal Fuel Transfer System Simplified Schematic - 161924 THRU 161987  
(Sheet 5)



18AC-460-10-(37-5)F-CAT1

Figure 3. Internal Fuel Transfer System Simplified Schematic - 161924 THRU 161987  
(Sheet 6)

13 5CAP508  
14 5CAC611  
NO.1 FUEL TANK



18AC-460-10-(37-6)23-CAT1

Figure 3. Internal Fuel Transfer System Simplified Schematic - 161924 THRU 161987  
(Sheet 7)

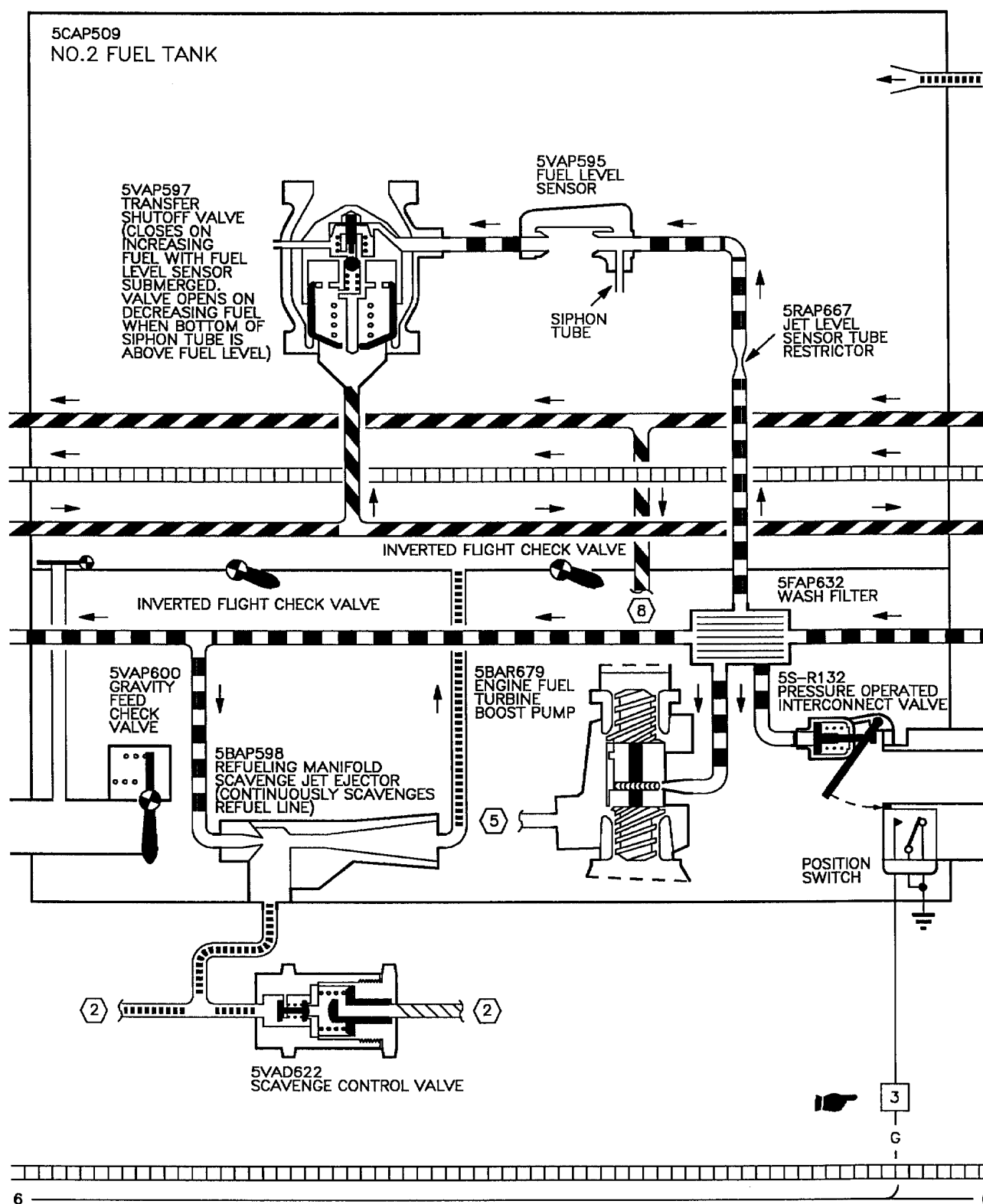
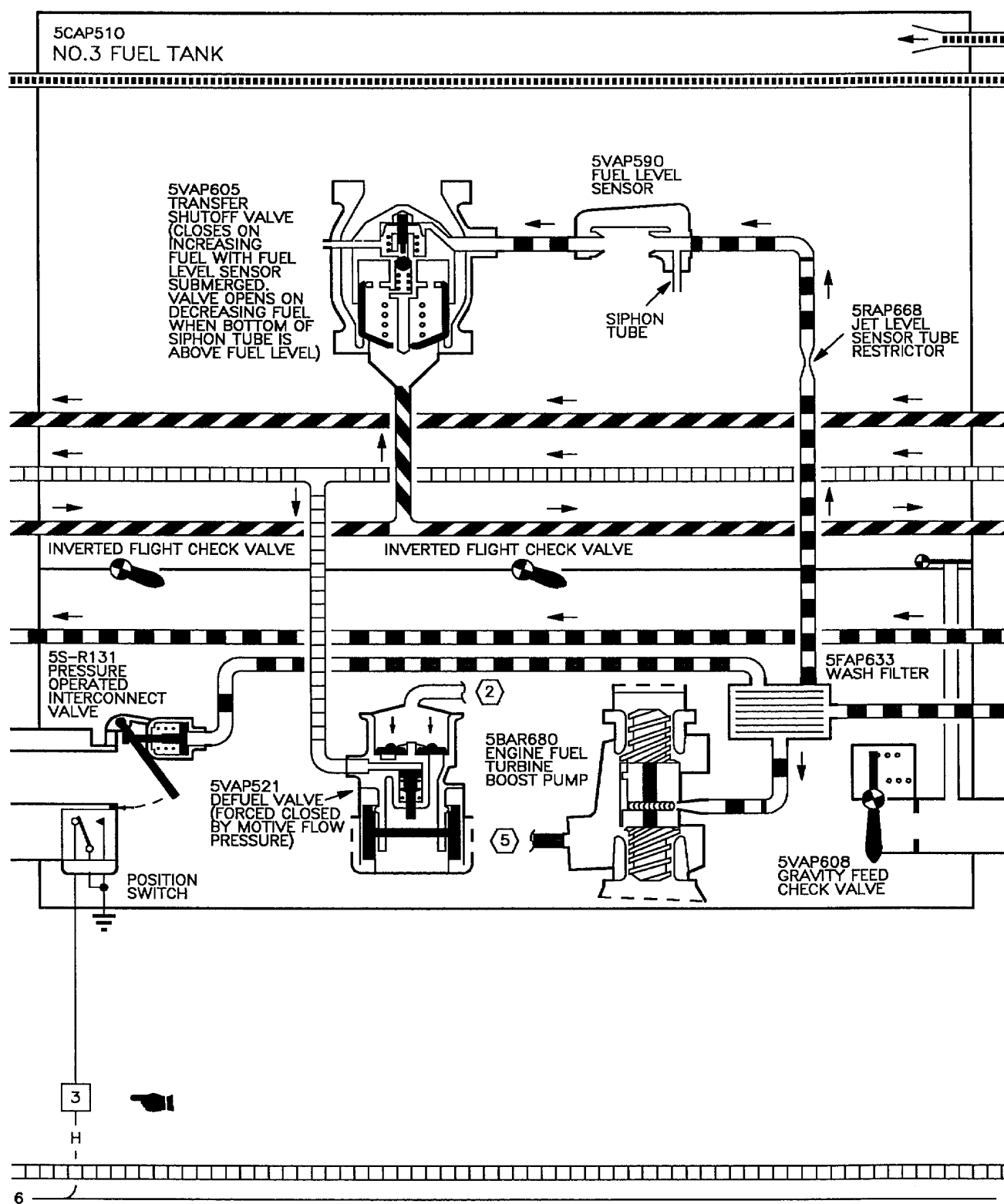
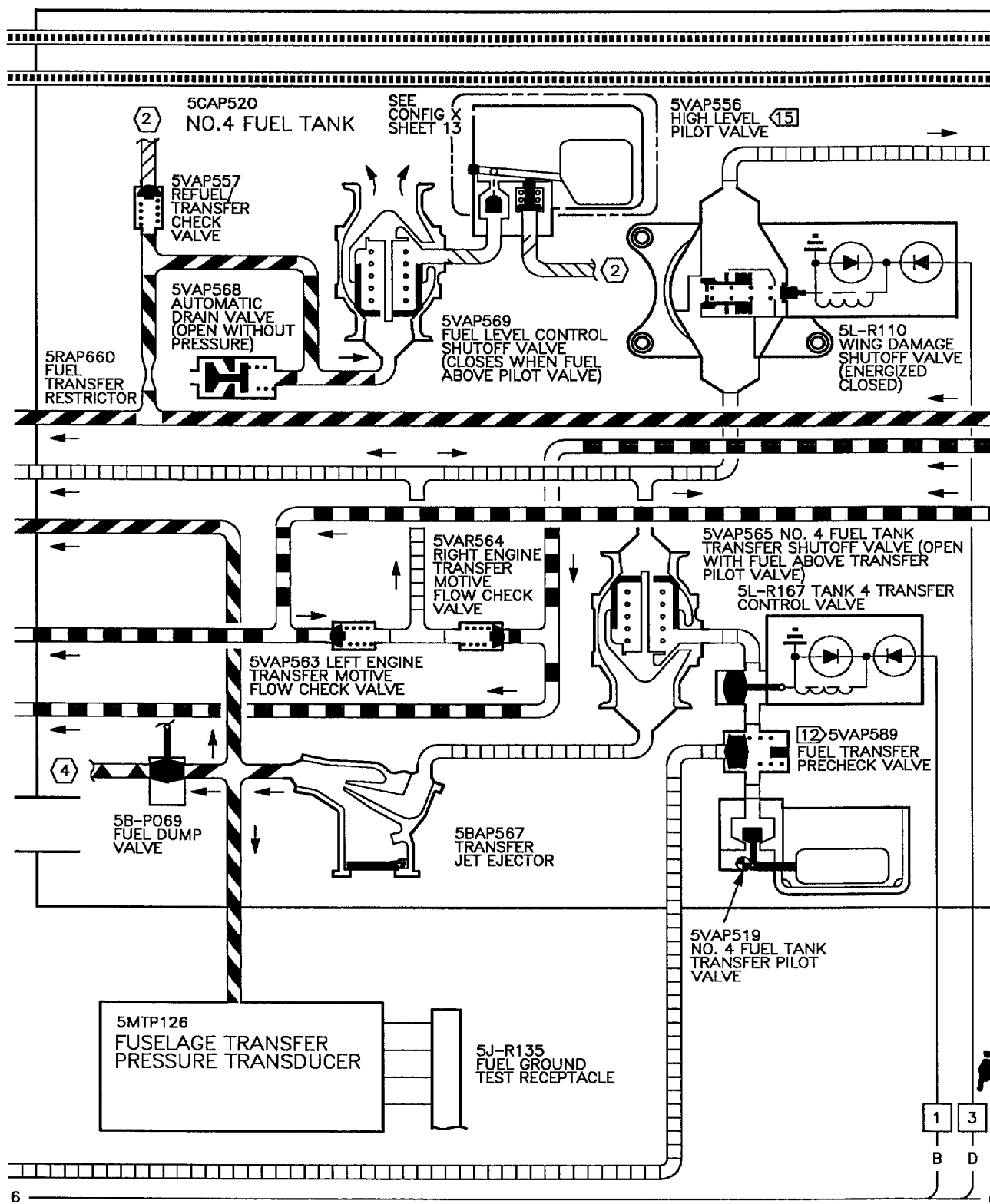


Figure 3. Internal Fuel Transfer System Simplified Schematic - 161924 THRU 161987  
(Sheet 8)



18AC-460-10-(37-8)22-CAT1

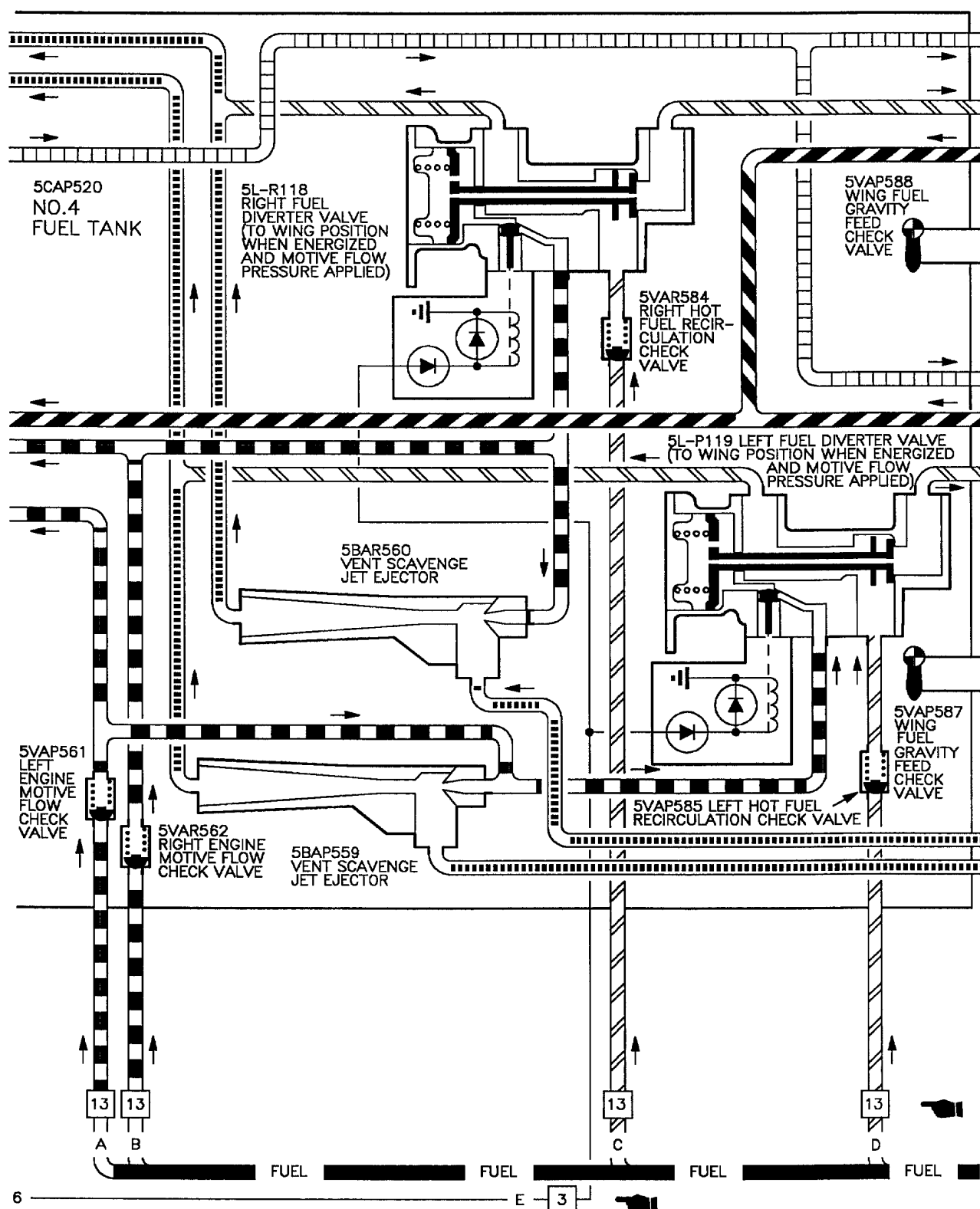
Figure 3. Internal Fuel Transfer System Simplified Schematic - 161924 THRU 161987  
(Sheet 9)



18AC-460-10-(37-9)22-CAT1

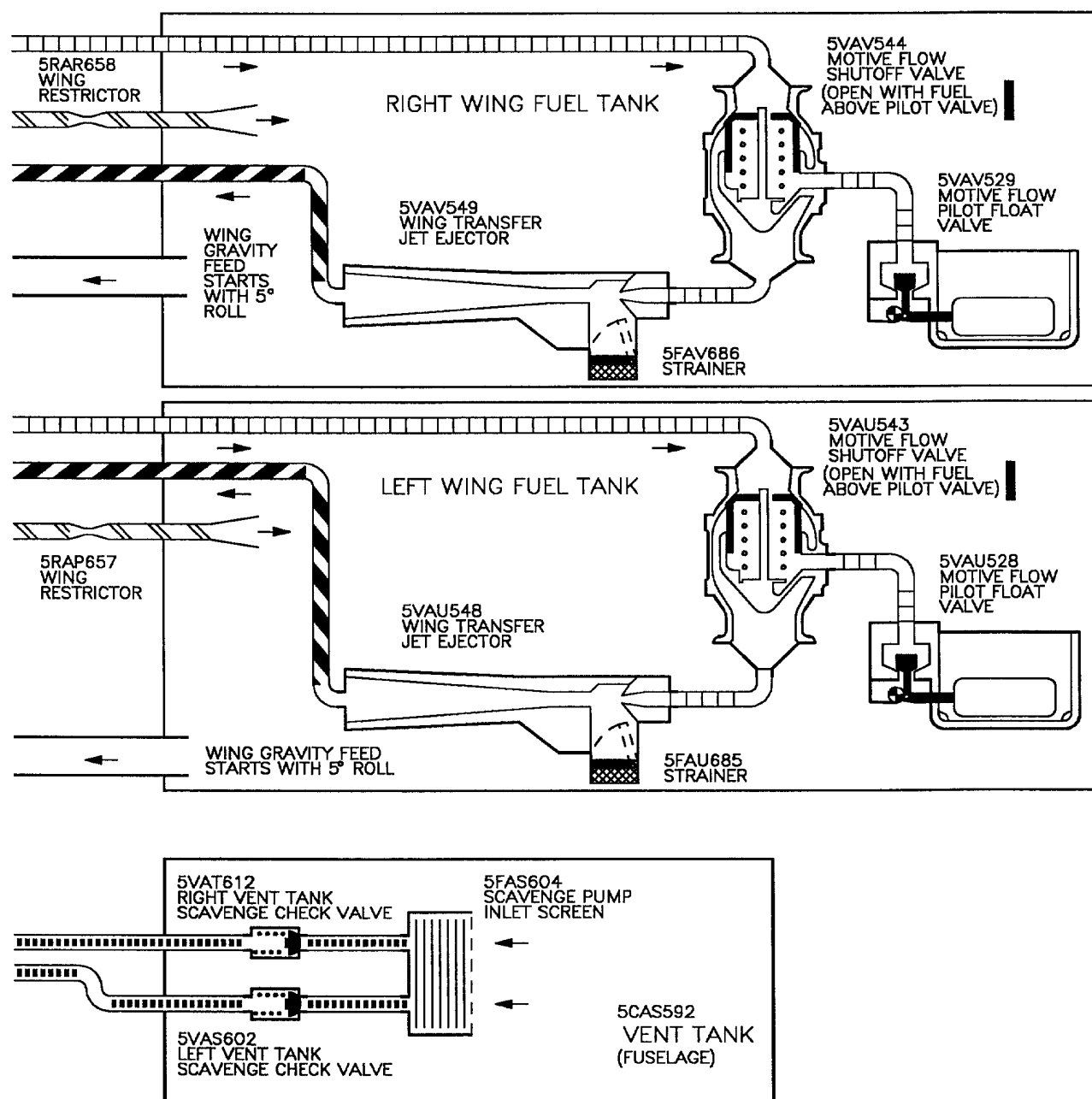
Figure 3. Internal Fuel Transfer System Simplified Schematic - 161924 THRU 161987  
(Sheet 10)





18AC-460-10-(37-10)22-CAT1

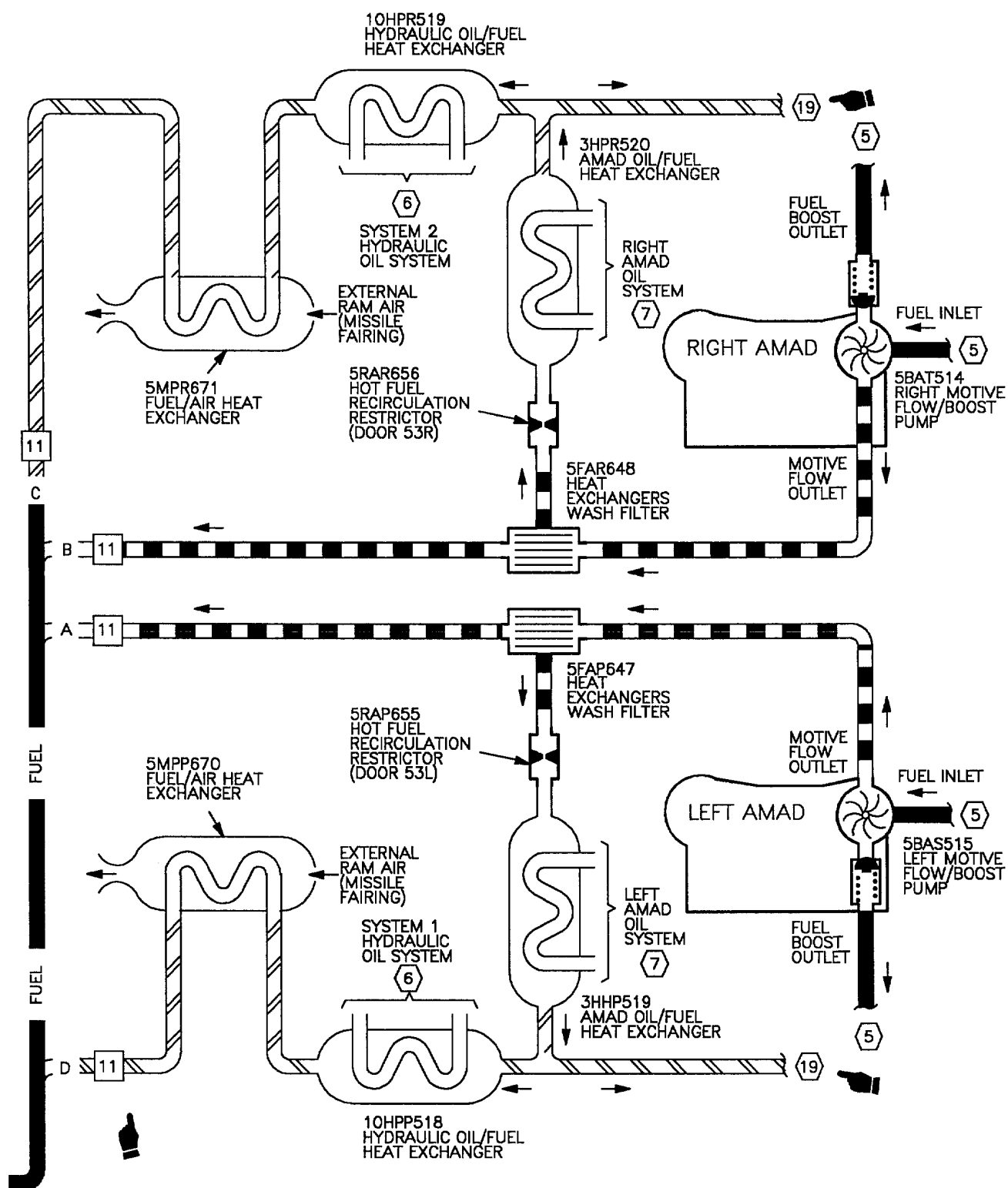
Figure 3. Internal Fuel Transfer System Simplified Schematic - 161924 THRU 161987  
(Sheet 11)



FUEL FUEL FUEL FUEL

Figure 3. Internal Fuel Transfer System Simplified Schematic - 161924 THRU 161987  
(Sheet 12)












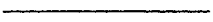
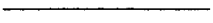
18AC-460-10-(37-11)22-CAT1



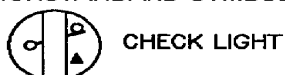
18AC-460-10-(37-12)22-CAT1

Figure 3. Internal Fuel Transfer System Simplified Schematic - 161924 THRU 161987  
(Sheet 13)



















## LEGEND

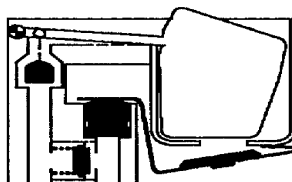
	FUEL		HIGHWAY FOR MULTIPLE FUEL PATTERNS		FUEL DUMP
	TRANSFER		SCAVENGE		REFUEL
	TRANSFER MOTIVE FLOW				ENGINE FUEL FEED
	MOTIVE FLOW				HOT FUEL RECIRCULATION
					VENT

## 1. NONSTANDARD SYMBOLS:



CHECK LIGHT

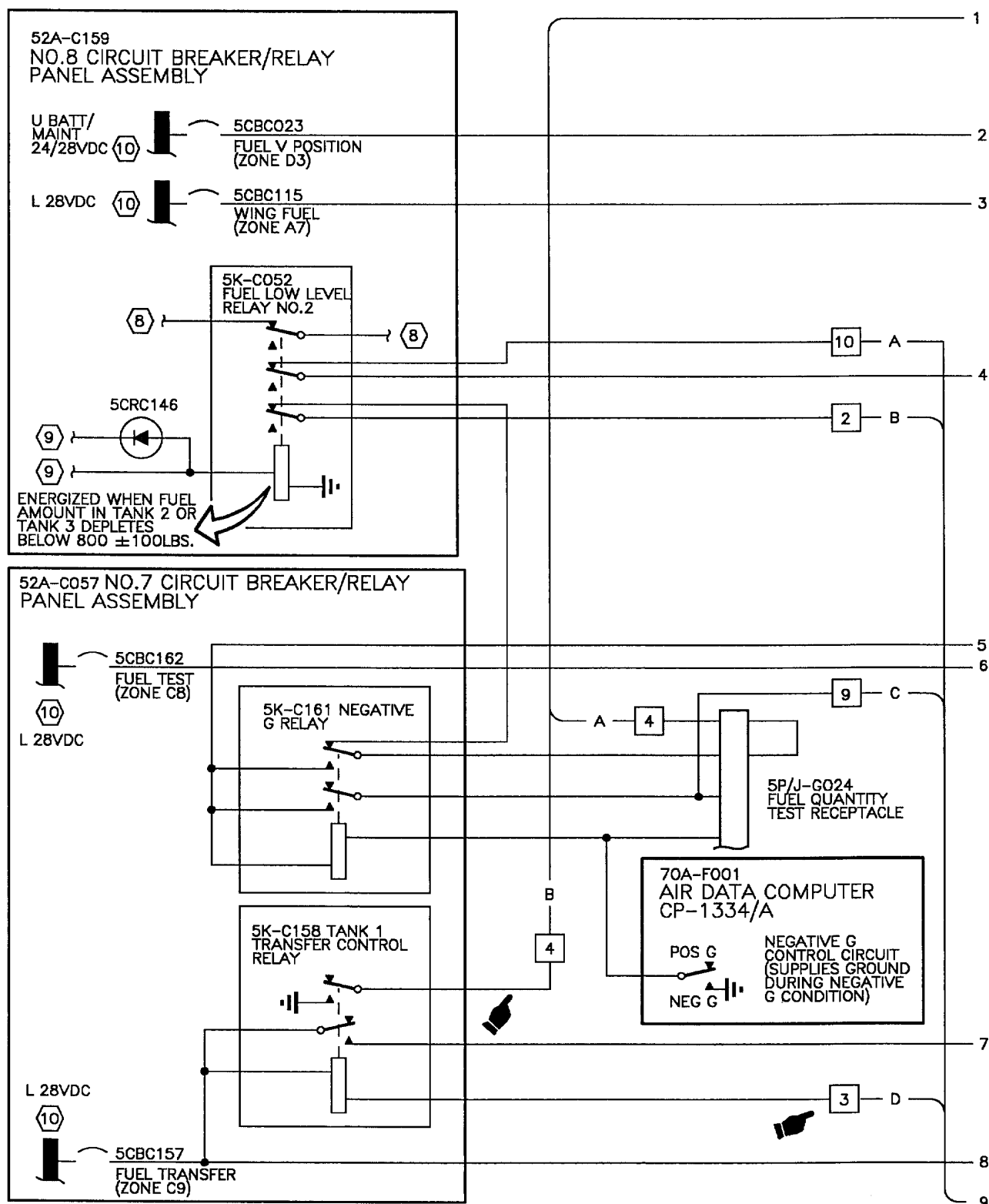
-  REFUEL/DEFUEL SYSTEM SIMPLIFIED SCHEMATIC, WPO07 00.
-  FUEL PRESSURIZATION AND VENT SYSTEM SIMPLIFIED SCHEMATIC, WPO20 00.
-  FUEL DUMP SYSTEM SIMPLIFIED SCHEMATIC, WPO17 02.
-  ENGINE FUEL SUPPLY SYSTEM SIMPLIFIED SCHEMATIC, WPO16 00.
-  HYDRAULIC SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-450-100, WPO03 00.
-  AMAD SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-240-100, WPO06 00.
-  EXTERNAL FUEL SYSTEM SIMPLIFIED SCHEMATIC, WPO11 00.
-  FUEL QUANTITY AND LOW LEVEL WARNING SYSTEM SIMPLIFIED SCHEMATIC, WPO23 02.
-  POWER DISTRIBUTION SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-420-100, WPO05 00.
-  MOTIVE FLOW LINE NORMALLY PLUGGED. MOTIVE FLOW LINE CONNECTED DURING INTERNAL FUEL TRANSFER AND ENGINE FUEL SUPPLY SYSTEM TEST.
-  161966 AND UP: ALSO 161924 THRU 161965 AFTER F/A-18 AFC 53, FUEL TRANSFER PRECHECK VALVE IS REMOVED FROM SYSTEM AND LINE FROM FUEL LEVEL CONTROL SELECTOR VALVE IS CAPPED AT TANK ENTRANCE.
-  F/A-18A.
-  F/A-18B.
-  2800095 HIGH LEVEL PILOT VALVE.
-  2800018 HIGH LEVEL PILOT VALVE.
-  BEFORE F/A-18 AFC 48.
-  AFTER F/A-18 AFC 48.
-  HOT FUEL RECIRCULATION SYSTEM SIMPLIFIED SCHEMATIC, WPO18 02.



 HIGH LEVEL PILOT VALVE  
CONFIGURATION X

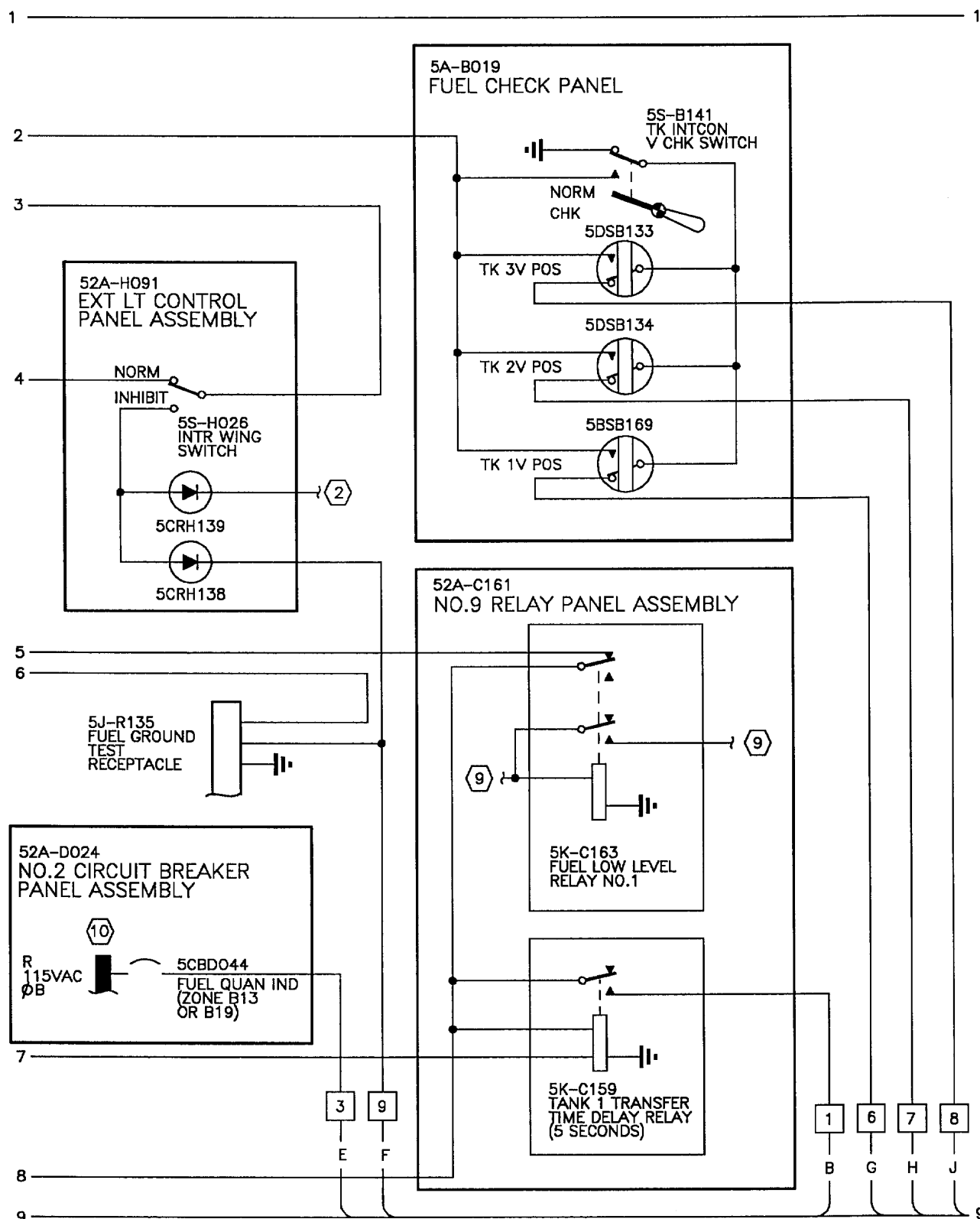
18AC-460-10-(37-13)22-CATI

Figure 3. Internal Fuel Transfer System Simplified Schematic - 161924 THRU 161987  
(Sheet 14)



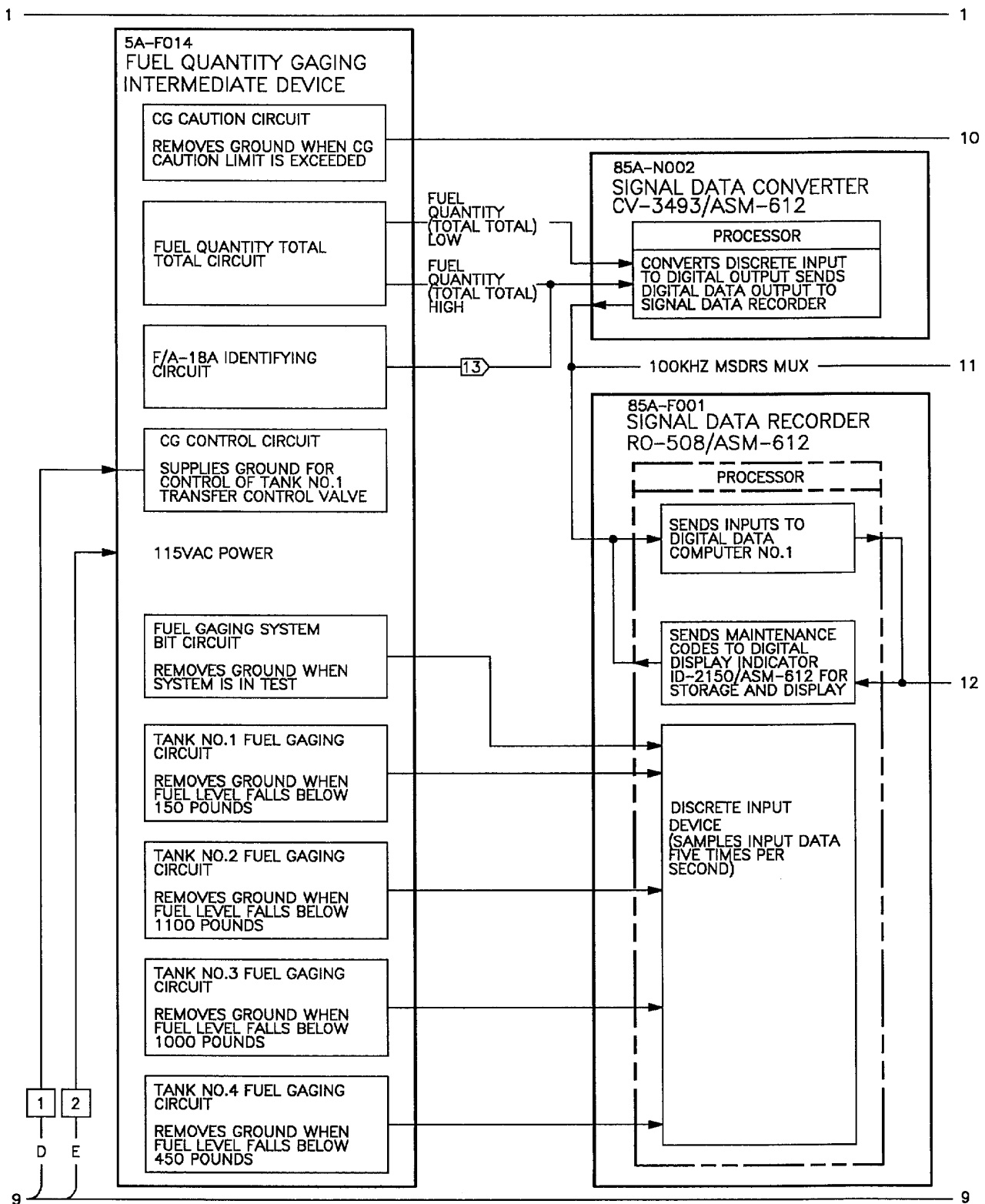
18AC-460-10-(42-1)22-CAT1

**Figure 4. Internal Fuel Transfer System Simplified Schematic - 162394 AND UP**  
(Sheet 1)



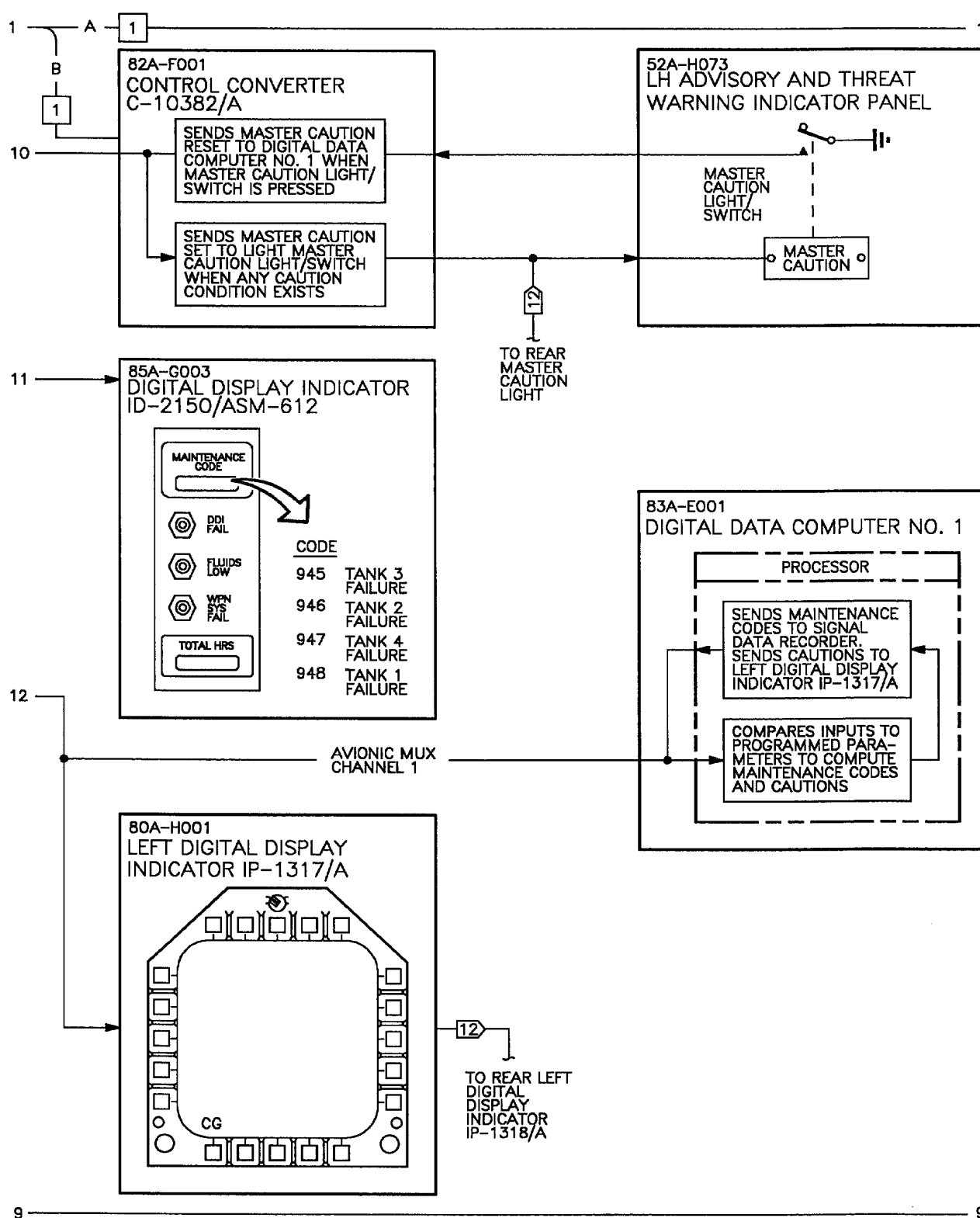
18AC-460-10-(42-2)B-CATI

Figure 4. Internal Fuel Transfer System Simplified Schematic - 162394 AND UP  
(Sheet 2)



18AC-460-10-(42-3)B-CATI

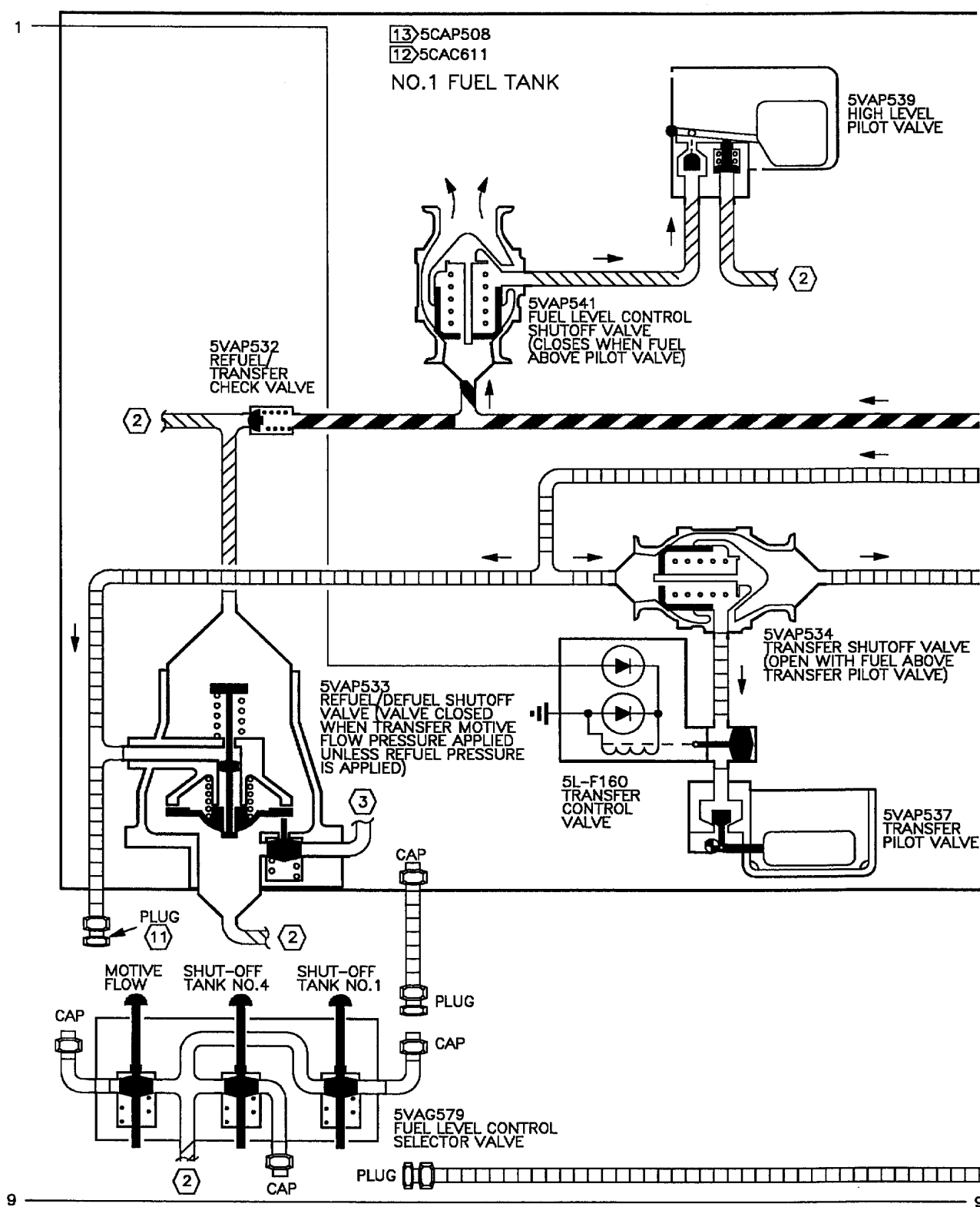
**Figure 4. Internal Fuel Transfer System Simplified Schematic - 162394 AND UP (Sheet 3)**



18AC-460-10-(42-4)B-CATI

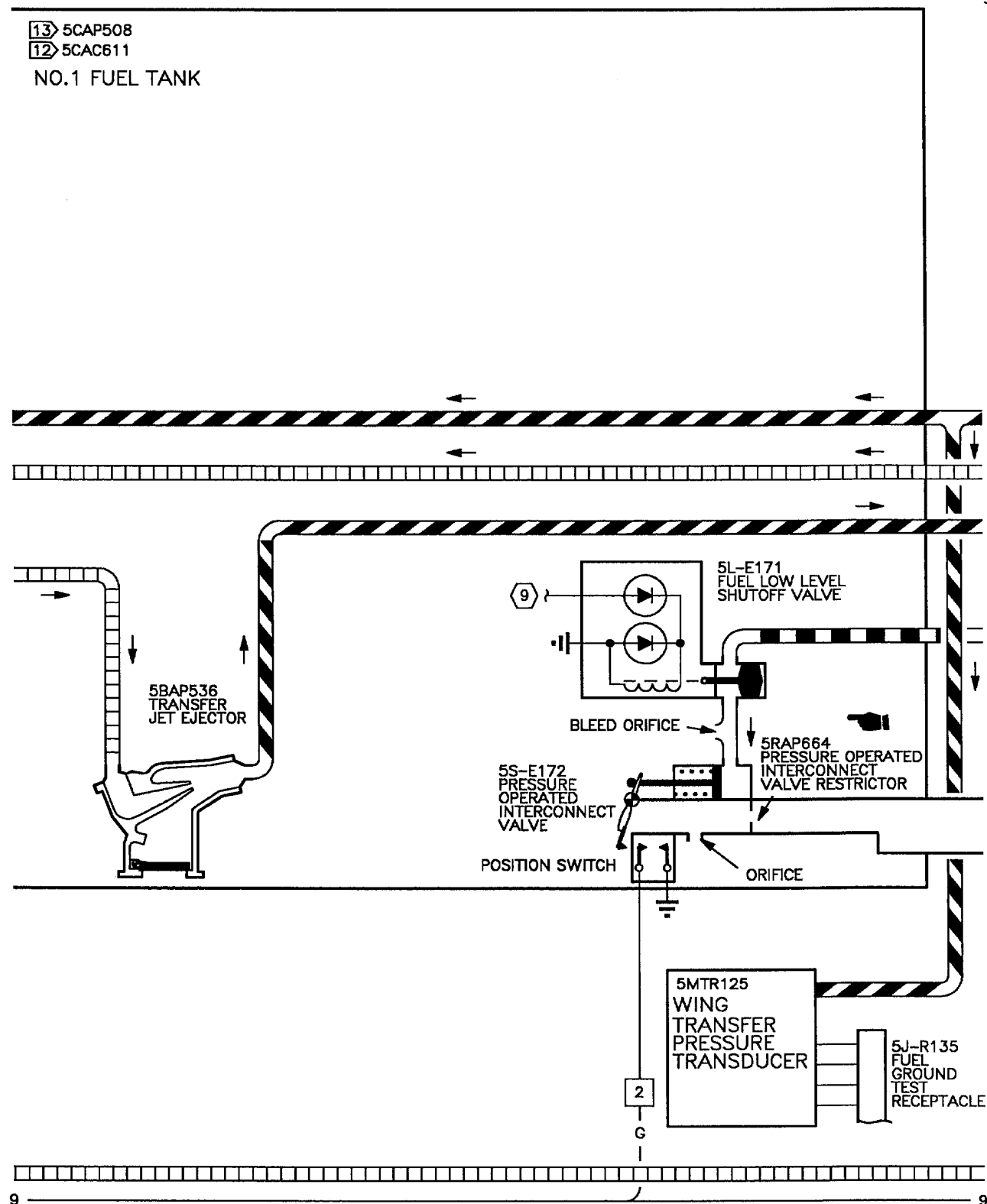
Figure 4. Internal Fuel Transfer System Simplified Schematic - 162394 AND UP  
(Sheet 4)





18AC-460-10-(42-5)19-CAT1

Figure 4. Internal Fuel Transfer System Simplified Schematic - 162394 AND UP  
(Sheet 5)



18AC-460-10-(42-6)23-CATI

**Figure 4. Internal Fuel Transfer System Simplified Schematic - 162394 AND UP  
(Sheet 6)**

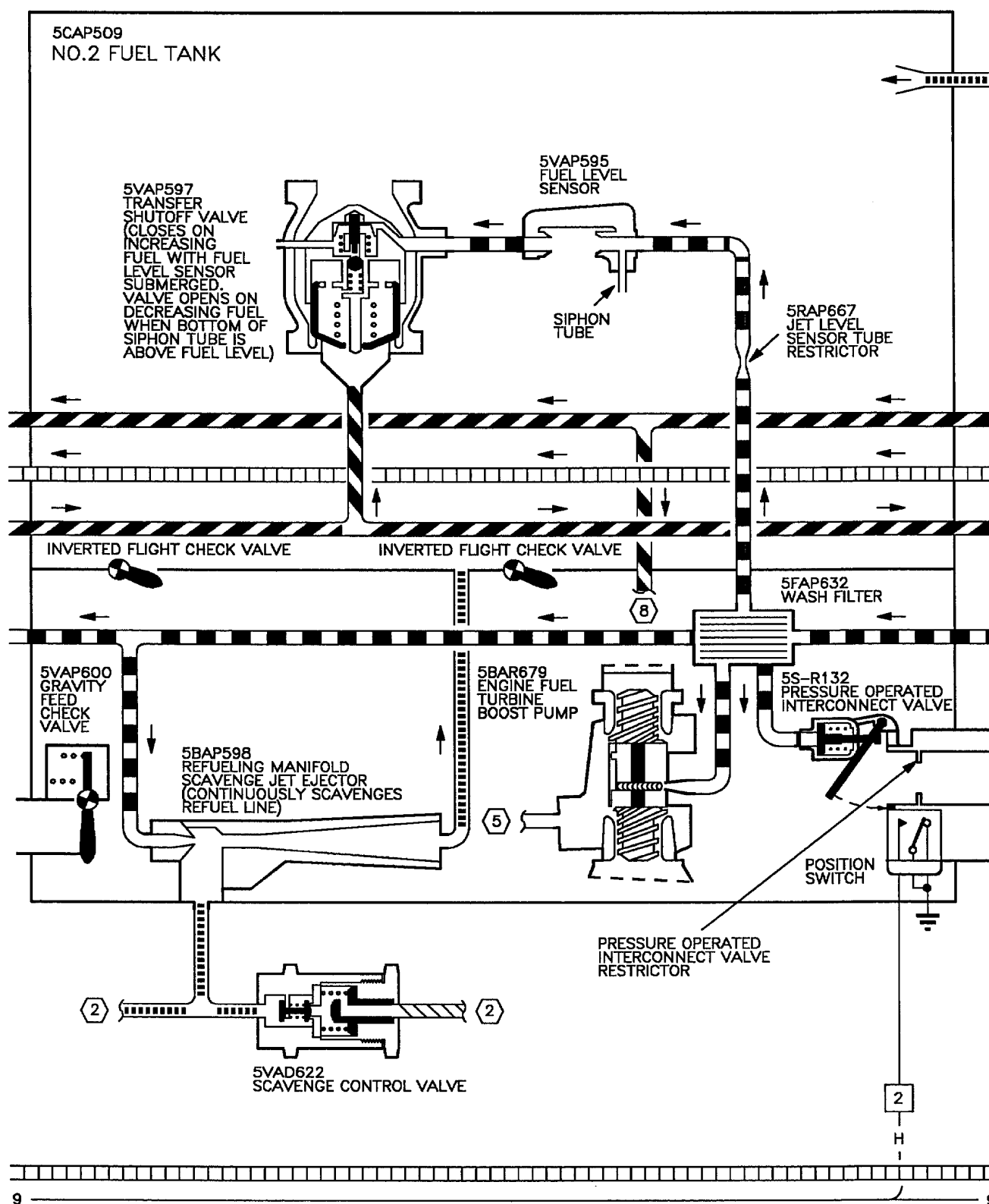


Figure 4. Internal Fuel Transfer System Simplified Schematic - 162394 AND UP  
(Sheet 7)

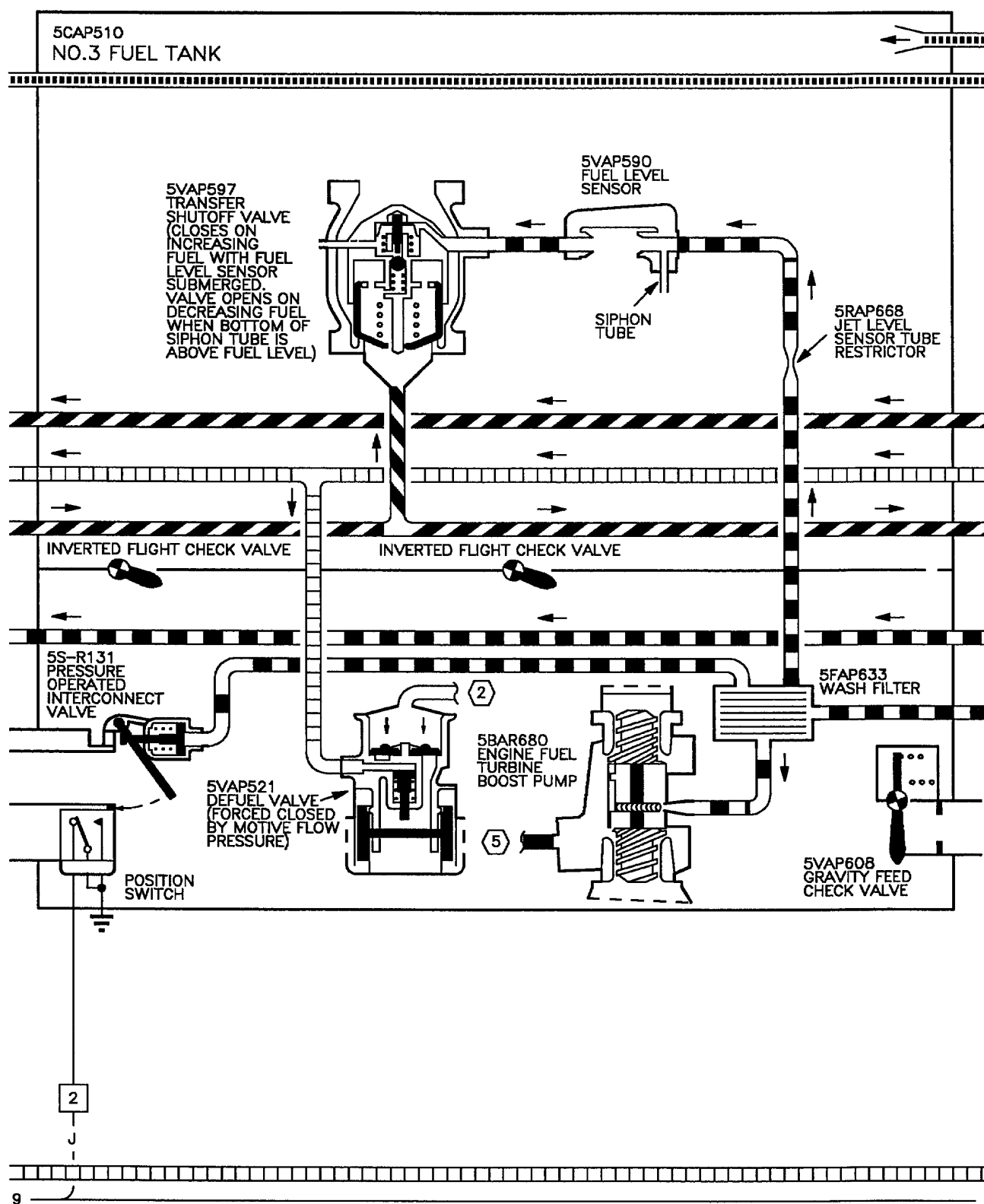


Figure 4. Internal Fuel Transfer System Simplified Schematic - 162394 AND UP  
(Sheet 8)

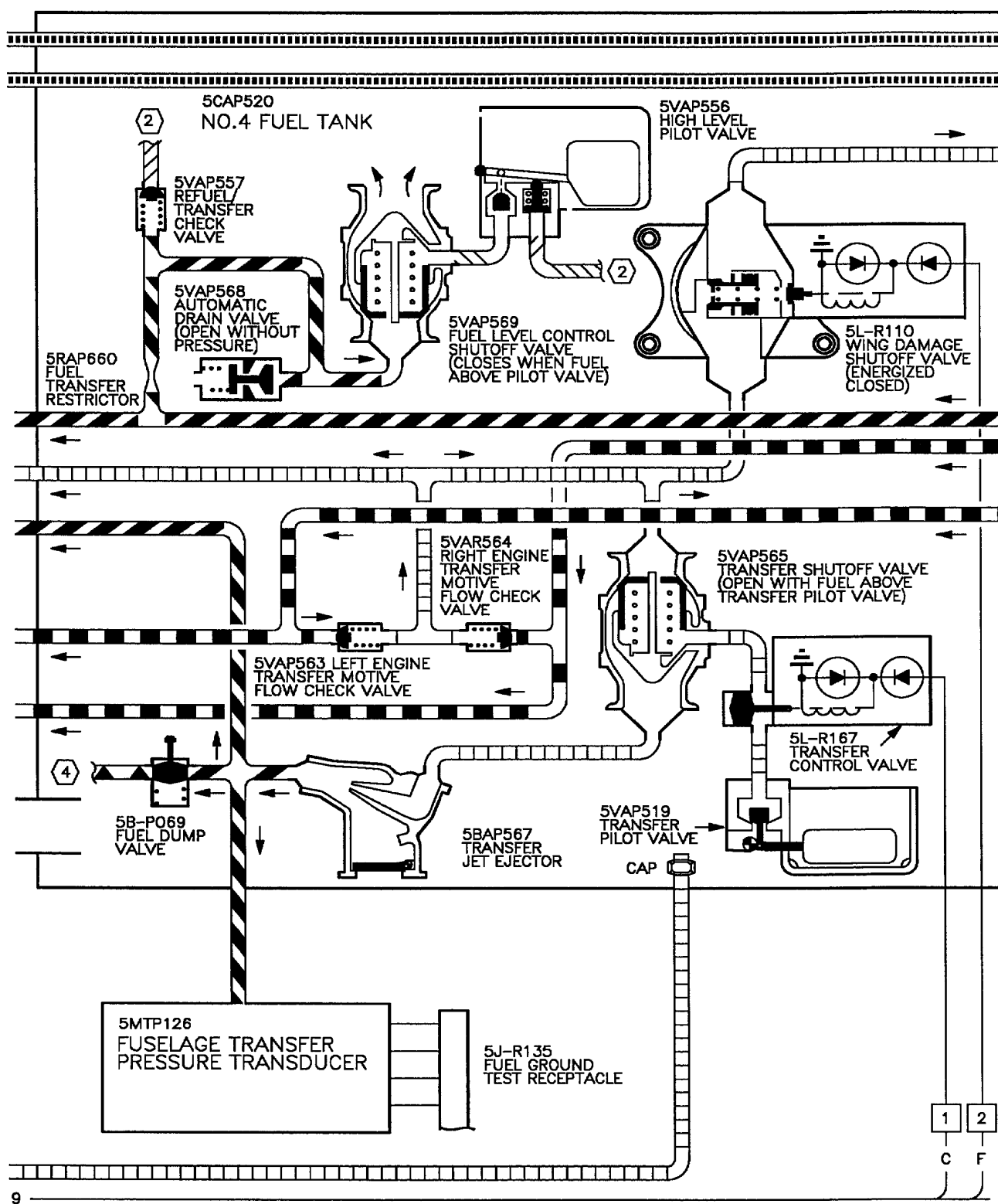
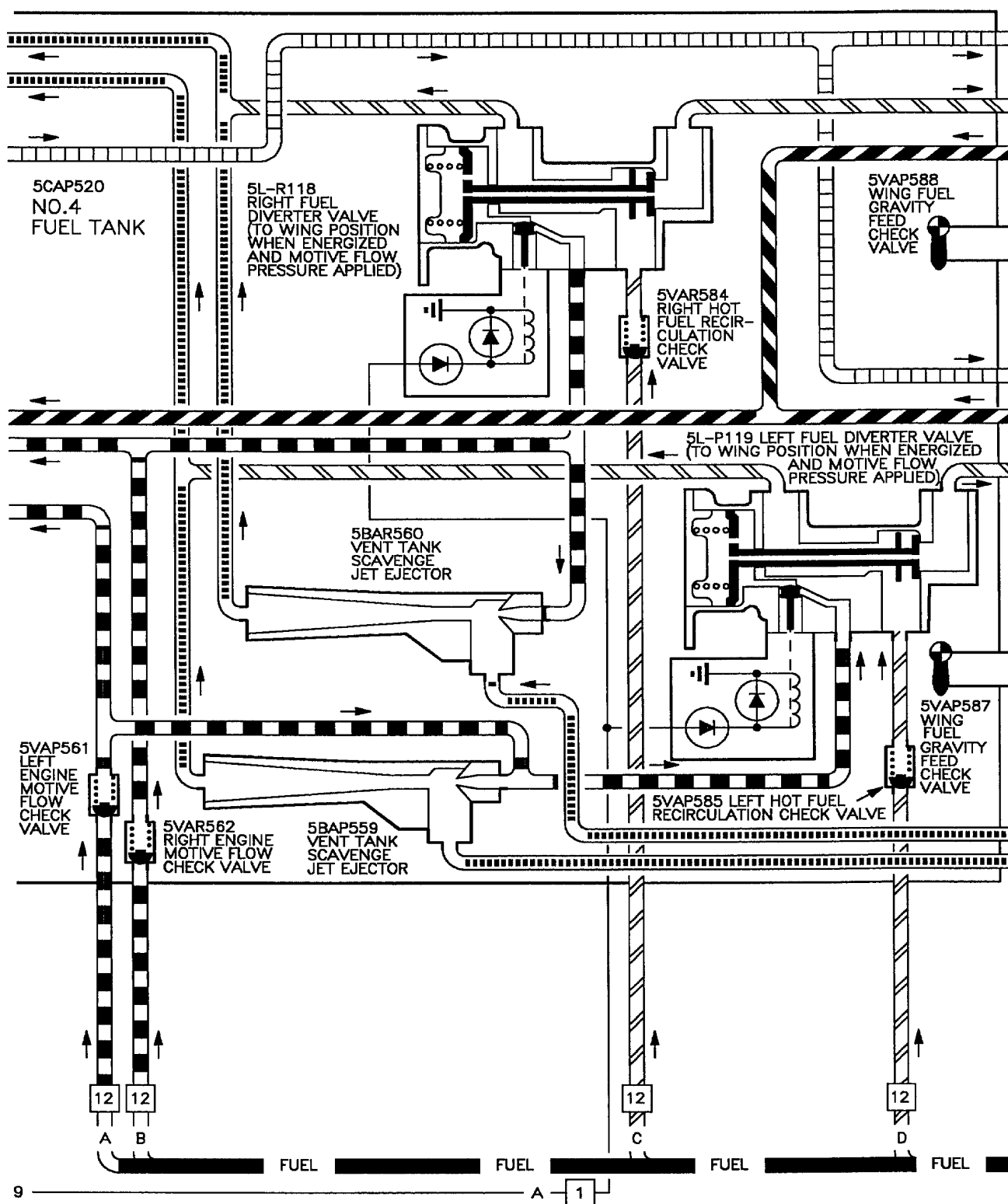


Figure 4. Internal Fuel Transfer System Simplified Schematic - 162394 AND UP  
(Sheet 9)

18AC-460-10-(42-9)C-CATI



18AC-460-10-(42-10)C-CATI

Figure 4. Internal Fuel Transfer System Simplified Schematic - 162394 AND UP  
(Sheet 10)

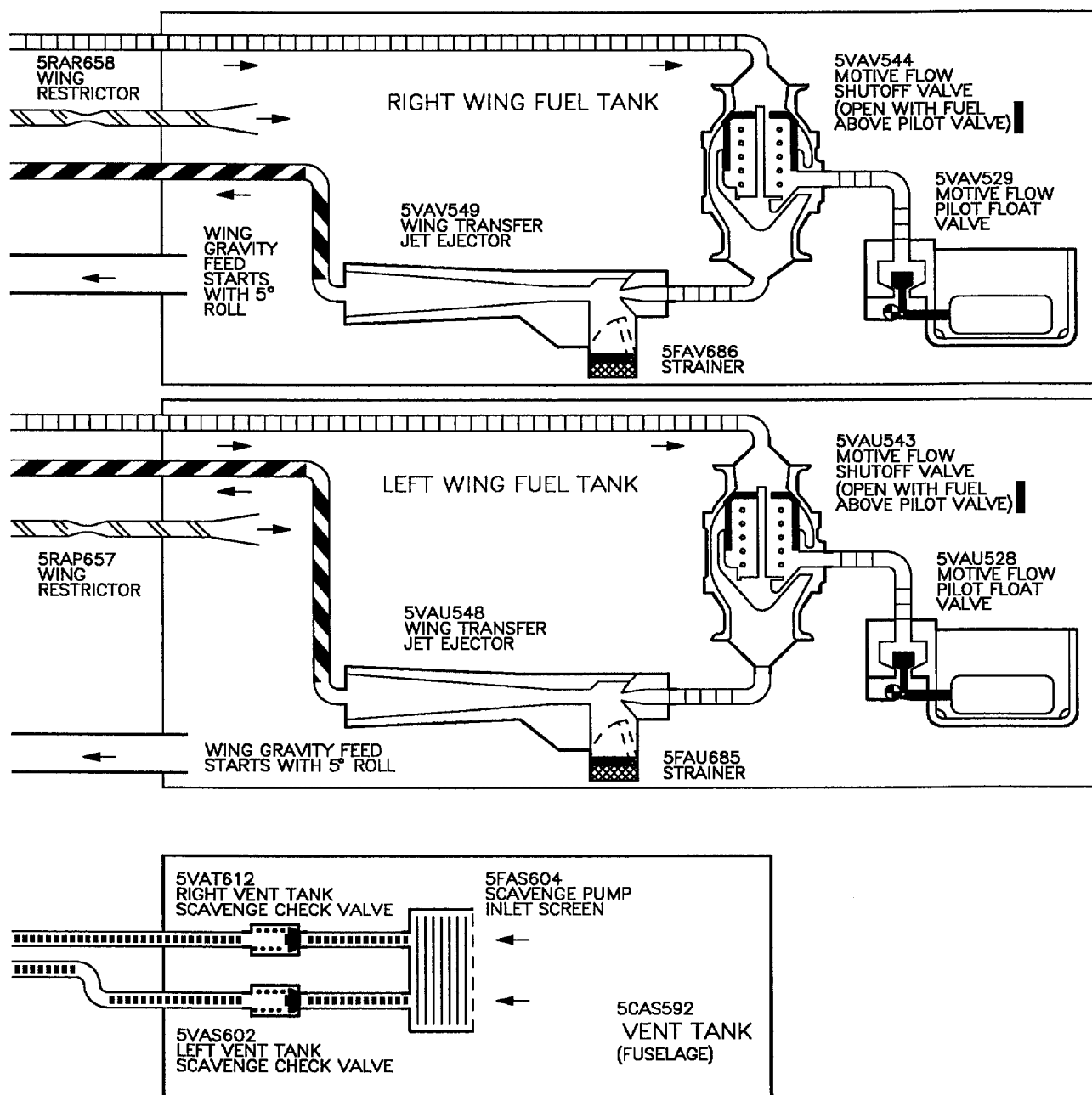
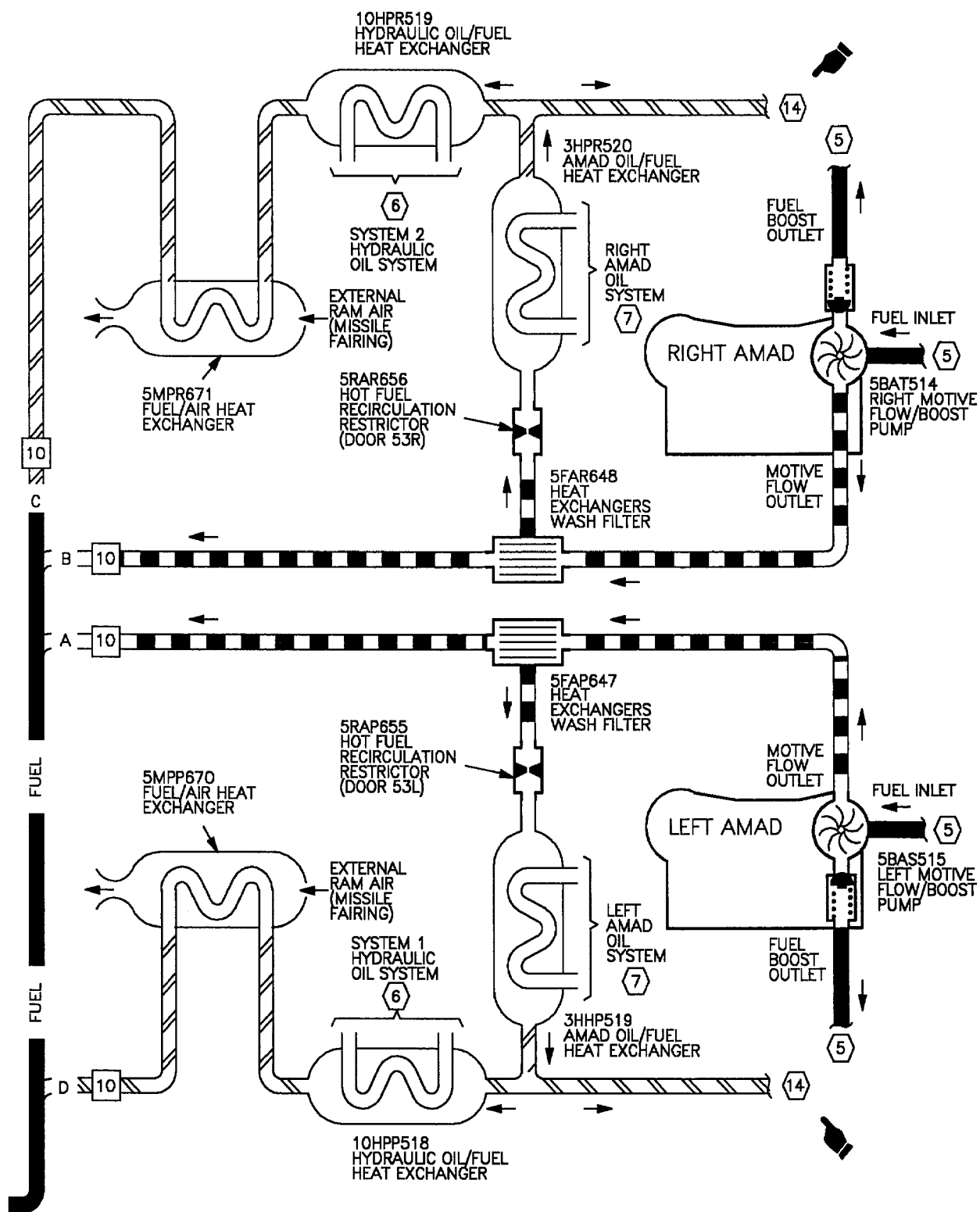


Figure 4. Internal Fuel Transfer System Simplified Schematic - 162394 AND UP  
(Sheet 11)











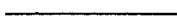


18AC-460-10-(42-12)22-CATI

Figure 4. Internal Fuel Transfer System Simplified Schematic - 162394 AND UP  
(Sheet 12)
















## LEGEND

	FUEL		HIGHWAY FOR MULTIPLE FUEL PATTERNS
	TRANSFER		
	SCAVENGE		
	TRANSFER MOTIVE FLOW		
	MOTIVE FLOW		
	FUEL DUMP		
	REFUEL		
	ENGINE FUEL FEED		
	HOT FUEL RECIRCULATION		
	VENT		

## 1. NONSTANDARD SYMBOLS:



CHECK LIGHT

-  REFUEL/DEFUEL SYSTEM SIMPLIFIED SCHEMATIC, WP007 00.
-  FUEL PRESSURIZATION AND VENT SYSTEM SIMPLIFIED SCHEMATIC, WP020 00.
-  FUEL DUMP SYSTEM SIMPLIFIED SCHEMATIC, WP017 02.
-  ENGINE FUEL SUPPLY SYSTEM SIMPLIFIED SCHEMATIC, WP016 00.
-  HYDRAULIC SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-450-100, WP003 00.
-  AMAD SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-240-100, WP006 00.
-  EXTERNAL FUEL SYSTEM SIMPLIFIED SCHEMATIC, WP011 00.
-  FUEL QUANTITY AND LOW LEVEL WARNING SYSTEM SIMPLIFIED SCHEMATIC, WP023 02.
-  POWER DISTRIBUTION SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-420-100, WP005 00.
-  MOTIVE FLOW LINE NORMALLY PLUGGED. MOTIVE FLOW LINE CONNECTED DURING INTERNAL FUEL TRANSFER AND ENGINE FUEL SUPPLY SYSTEM TEST.
-  F/A-18B.
-  F/A-18A.
-  HOT FUEL RECIRCULATION SYSTEM SIMPLIFIED SCHEMATIC, WP018 02.

**Figure 4. Internal Fuel Transfer System Simplified Schematic - 162394 AND UP  
(Sheet 13)**



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**ORGANIZATIONAL MAINTENANCE****PRINCIPLES OF OPERATION****DESCRIPTION AND OPERATION****ENGINE FUEL SUPPLY SYSTEM**

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**Reference Material**

Powerplant and Related Systems .....	A1-F18AC-270-100
Basic Engine System .....	WP003 00
Secondary Power System .....	A1-F18AC-240-100
Principles of Operation .....	WP003 00
APU .....	WP005 00
Fire Extinguishing System .....	WP010 00
Fuel System .....	A1-F18AC-460-100
Operation .....	WP003 01
Engine Fuel Supply System Component Locator .....	WP015 01
Engine Fuel Supply System Simplified Schematic .....	WP016 00
Internal Fuel Transfer System Description .....	WP012 00
Fuel Dump System Description and Operation .....	WP017 00
Hot Fuel Recirculation System Description and Operation .....	WP018 00
Maintenance Status Display and Recording System .....	A1-F18AC-580-100
Operation .....	WP005 00
Mission Computer System .....	A1-F18AC-741-100
Description - System and Component .....	WP003 00
Multipurpose Display Group .....	A1-F18AC-745-100
Description .....	WP003 00

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System Controls and Indicators .....	3
System Description .....	2
Operation .....	4
Component Operation .....	4
System Operation .....	4

## Record of Applicable Technical Directives

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 IAFC-056	27 Mar 85	Fuel System Components Replacement and System Inspection (ECP-MDA-F/A-18-00158R1 and ECP MDA-F/A-18-00160)	1 Jul 85	-
F/A-18 AFC 18	-	Incorporation of Fuel Turbine Boost Pump/ Sealing of Raised Baffle in Fuel Tanks 2 and 3 (ECP-MDA-F/A-18-00077C1/C2)	15 Jun 86	-
F/A-18 AFC 70	-	Installation of Motive Flow Boost Pump Pressure Switch (ECP MDA-F/A-18-00158R2)	15 Jun 86	-

## 1. DESCRIPTION.

2. **SYSTEM DESCRIPTION.** The engine fuel supply system supplies fuel to the engines for operation at all power settings and in all operating conditions. The engine fuel supply system is powered by motive flow fuel pressure generated by the two AMAD driven motive flow/boost pumps. Each engine is supplied fuel by separate feed systems. Tank 2 and the left motive flow/boost pump supplies fuel to the left engine. Tank 3 and the right motive flow/boost pump supplies fuel to the right engine. The left and right systems are connected by the crossfeed valve downstream of the motive flow/boost pumps.

3. During inverted flight, the inverted flight baffles (WP012 00), provide captive fuel for engine operation. In emergency conditions, fuel flow to either engine can be terminated by line mounted shutoff valves upstream of the motive flow boost pumps.

4. **COMPONENT DESCRIPTION.** Engine fuel supply system components shown in WP015 01 are described in the paragraphs below. For related component descriptions listed below, see applicable reference.

a. APU fuel shutoff valve (A1-F18AC-240-100, WP003 00).

b. Fuel/oil heat exchange check valve (WP018 00).

c. Fuel feedline temperature sensor (WP018 00).

5. **Engine Fuel Boost Ejectors - 161353 THRU 161761 BEFORE F/A-18 AFC 18.** The engine fuel

boost jet ejectors are motive flow operated, pressure induced (suction) ejectors located in tanks 2 and

3. The ejectors provide pressurized fuel to the inlet side of the motive flow/boost pump. The ejectors will function in both normal and inverted flight. Each ejector inlet is covered with a screen to prevent entry of foreign objects (WP003 01).

6. **Engine Fuel Turbine Boost Pump - 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 18.**

The engine fuel turbine boost pumps are motive flow driven pumps located in tanks 2 and 3. The turbine boost pump provides pressurized fuel to the inlet side of the motive flow/boost pump. The turbine boost pumps will operate in normal or inverted flight. Each turbine boost pump inlet is covered with a screen to prevent entry of foreign objects (WP003 01).

7. **Engine Fuel Shutoff Valves.** The engine fuel shutoff valves are motor operated 28vdc valves. The motor driven butterfly type valves prevent fuel flow to the engine when closed.

8. **Fuel Crossfeed Shutoff Valve - 163119 AND UP; ALSO 161353 THRU 161924 BEFORE F/A-18 IAFC-056 OR 161353 THRU 163118 AFTER F/A-18 AFC 70.**

The fuel crossfeed shutoff valve is a 28vdc motor operated butterfly valve used to control fuel flow between the left and right engines. The shutoff valve is normally energized open or closed by the left and/or right fuel boost pressure switches. In emergency conditions, the shutoff valve can be closed by pushing the FIRE warning light on

the LH/RH advisory and threat warning indicator panel.

**9. Fuel Crossfeed Shutoff Valve - 161925 THRU 163118 BEFORE F/A-18 AFC 70 AND 161353 THRU 161924 AFTER F/A-18**

**IAFC-056.** The fuel crossfeed valve is a 28vdc motor driven butterfly valve used to control fuel flow between the left and right engines. The shutoff valve is normally open. In emergency conditions, the shutoff valve can be closed by pushing the FIRE warning light on the LH/RH advisory and threat warning indicator panel.

**10. Fuel Boost Pressure Switches - 163119 AND UP; ALSO 161353 THRU 161924 BEFORE F/A-18 IAFC-056 AND 161353 THRU 163118 AFTER F/A-18 AFC 70.** The fuel boost pressure switches are pressure sensing switches located on the motive flow/boost pumps. The switches are used to identify and transmit a low boost pressure indication if boost pressure is below 10  $\pm$ 0.5 psi.

**11. Boost Inlet Pressure Transducers.** Used in testing and troubleshooting, the boost inlet pressure transducers measure the pressure from the engine fuel boost jet ejector or engine fuel turbine boost pump (this WP). The fuel pressure readings are converted to electrical signals and displayed on the fuel system test set.

**12. Engine Fuel Coupling Check Valves.** The engine fuel coupling check valves provide a quick disconnect and check valve feature between the fuel feed lines and engine.

**13. Motive Flow/Boost Pumps.** The motive flow/boost pump is a two stage, single shaft centrifugal pump mounted on the left and right AMAD. The low pressure (boost) stage supplies approximately 20 to 53 psi fuel for engine operation. The high pressure stage (motive flow) provides approximately 45 to 138 psi fuel pressure for operation of the engine fuel boost jet ejectors or engine fuel turbine boost pumps (this WP), fuel dump system (WP017 00), and internal fuel transfer system (WP012 00).

**14. RELATED SYSTEMS.** Systems related to the engine fuel supply system are listed below.

**15. Secondary Power Supply.** The fuel system motive flow/boost pumps are installed on the airframe mounted accessory drive (AMAD) units

(A1-F18AC-270-100, WP003 00). During normal operation, the engine powers AMAD accessories.

16. The AMAD fuel/oil heat exchanger cools AMAD lube oil with fuel.

17. Aircraft fuel is supplied to the APU through the APU fuel shutoff valve and the fuel control (FCU) solenoid shutoff valve (A1-F18AC-240-100, WP005 00).

**18. Maintenance Status Display and Recording System (MSDRS).** The maintenance status display and recording system receives inputs from the fuel system through the signal data converter and recorder. The MSDRS signal data recorder sends data to the mission computer system for processing. If the mission computer system detects a fuel system failure, it sends the applicable maintenance code to the MSDRS signal data recorder which sends it to the nose wheelwell Digital Display Indicator ID-2150/ASM-512 for storage and display (A1-F18AC-580-100, WP005 00).

**19. Mission Computer System.** The mission computer system receives fuel system data from the MSDRS. The mission computer system digital data computer no. 1 processes the data to determine when a fuel system failure or caution condition occurs. If a failure occurs, digital data computer no. 1 sends the applicable maintenance code to the MSDRS for storage and display. If a caution condition occurs, digital data computer no. 1 sends the caution message to the multipurpose display group for display (A1-F18AC-741-100, WP003 00).

**20. Multipurpose Display Group.** If the mission computer system detects a fuel system caution condition, it sends the caution message to the multipurpose display group. The left Digital Display Indicator IP-1317( ) and on F/A-18B, the rear left Digital Display Indicator IP-1318( ) receive and display the caution messages (A1-F18AC-745-100, WP003 00).

**21. SYSTEM CONTROLS AND INDICATORS.** The engine fuel supply system controls and indicators are listed below.

**22. LH/RH Advisory and Threat Warning Indicator Panel.** The yellow MASTER CAUTION light on LH panel indicates a fuel system advisory/caution requiring attention, but no immediate action. Fuel system advisories/cautions are displayed on left DDI or caution light indicator panel.

23. The engine FIRE warning lights, made up of a light and switch, are located on the LH/RH advisory and threat warning indicator panels in the cockpit. During engine operation, if an overtemperature condition occurs in either AMAD or engine bay, the respective left or right engine FIRE warning light will come on (A1-F18AC-240-100, WP010 00). Pressing the FIRE warning light closes the respective fuel shutoff valve, fuel crossfeed valve, and arms the fire extinguishing system.

24. **Digital Display Indicator IP-1317( ), IP-1318( ).** On 163119 AND UP; ALSO 161353 THRU 161924 BEFORE F/A-18 IAFC-056 OR 161353 THRU 163118 AFTER F/A-18 AFC

70. L BOOST LO or R BOOST LO caution will appear on left Digital Display Indicator IP-1317( ) in the cockpit and on F/A-18B, left Digital Display Indicator IP-1318( ) in the rear cockpit if motive flow/boost pump pressure depletes below 10  $\pm$ 0.5 psi.

25. **Digital Display Indicator ID-2150/ASM-612.** The Digital Display Indicator ID-2150/ASM-612 in the nose wheelwell stores and displays fuel system maintenance failure codes as listed below:

- a. 942 - Right fuel shutoff valve closed.
- b. 943 - Left fuel shutoff valve closed.
- c. 944 - 163119 AND UP; ALSO 161353 THRU 161924 BEFORE F/A-18 IAFC-056 OR 161353 THRU 163118 AFTER F/A-18 AFC 70.

Left or right fuel boost low with crossfeed valve closed.

Left and right fuel boost high with crossfeed valve open.

Left or right shutoff valves closed with crossfeed valve open.

- 944 - 161925 THRU 163118 BEFORE F/A-18 AFC 70 OR 161353 THRU 161924 AFTER F/A-18 IAFC-056.

Will always be displayed, indicating crossfeed valve open. When code 944 is not displayed the crossfeed valve is failed closed.

## 26. OPERATION.

27. **COMPONENT OPERATION.** A detailed operational description is given in WP003 01 for components listed below:

- a. engine fuel boost jet ejector
- b. engine fuel turbine boost pump

28. **Engine Fuel Shutoff Valves.** When energized closed, by 28vdc, the engine fuel shutoff valve closes stopping fuel flow. As the shutoff valve closes, the open limit switch is reset and the closed limit switch de-energizes the shutoff valve. When energized open, the shutoff valve opens, allowing fuel flow. As the shutoff valve opens, the closed limit switch is reset and the open limit switch de-energizes the shutoff valve.

29. **Motive Flow/Boost Pumps.** The motive flow/boost pump is driven by the AMAD. The first stage of the pump routes fuel to the engine inlet at approximately 20 to 53 psi. The pump second stage increases fuel pressure to approximately 45 to 138 psi. Second stage fuel (motive flow) is used to operate the engine fuel jet ejectors or engine fuel turbine boost pumps (this WP). Motive flow fuel is also used to operate the internal fuel transfer system (WP012 00), fuel dump system (WP017 00), and provide fuel flow for the hot fuel recirculation system (WP018 00).

30. **SYSTEM OPERATION.** A simplified schematic in WP016 00 and component locator in WP015 01 shows the entire engine fuel supply system in detail.

31. The motive flow/boost pump supplies motive flow pressure to the fuel system. Motive flow pressure operates engine fuel boost ejectors or turbine boost pumps in feed tanks 2 and 3 inducing flow to the boost stage of the motive flow/boost pump. Each boost pump accepts fuel from a separate engine feed system. Tank 2 feeds the left engine and tank 3 feeds the right engine. The boost pump supplies engine fuel boost pressure to the engines through the normally open engine fuel shutoff valves. If the left or right engine FIRE warning light comes on, the applicable FIRE warning light is pressed. This closes the engine fuel shutoff and fuel crossfeed shutoff valves and arms the fire extinguishing system (A1-F18AC-240-100, WP010 00).

32. On 163119 AND UP; ALSO 161353 THRU 161924 BEFORE F/A-18 IAFC-056 OR 161353 THRU 163118 AFTER F/A-18 AFC 70, the fuel crossfeed shutoff valve is normally closed when both left and right fuel boost pressure switches sense pressure above  $10 \pm 0.5$  psi. When pressure depletes below  $10 \pm 0.5$  psi, L BOOST LO or R BOOST LO caution displays on cockpit digital display indicator, IP-1317( ). When L BOOST LO or R BOOST LO occurs, the crossfeed valve opens allowing operation of both engines from either feed tank.

33. On 161925 THRU 163118 BEFORE F/A-18 AFC 70 OR 161353 THRU 161924 AFTER F/A-18 IAFC-056, the fuel boost pressure switches are removed. The fuel crossfeed shutoff valve is always open unless FIRE warning light is pressed on LH/RH advisory and threat warning indicator panels.

34. **Engine Fuel Supply System Cautions/Codes.** Cautions are displayed on left cockpit DDI IP-1317( ), IP-1318( ) and light the MASTER CAUTION light. Codes are displayed on nose wheelwell DDI ID-2150/ASM-612. Engine fuel supply system cautions/codes are explained below.

35. L/R BOOST LO - 163119 AND UP; ALSO 161353 THRU 161924 BEFORE F/A-18 IAFC-056 OR

161353 THRU 163118 AFTER F/A-18 AFC 70. Caution that indicates the fuel pressure at the left or right boost pump is low.

36. Code 942. Code that indicates right fuel shutoff valve is closed.

37. Code 943. Code that indicates left fuel shutoff valve is closed.

38. Code 944 - 161353 THRU 161924 BEFORE F/A-18 IAFC-056 OR 161353 THRU 163118 AFTER F/A-18 AFC 70. Code that indicates:

a. Left or right fuel boost low with crossfeed valve closed.

b. Left and right fuel boost high with crossfeed valve open.

c. Left or right shutoff valves closed with crossfeed valve open.

39. Code 944 - 161925 THRU 163118 BEFORE F/A-18 AFC 70 OR 161353 THRU 161924 AFTER F/A-18 IAFC-056. Code will always be displayed indicating crossfeed valve open. When code 944 is not displayed the crossfeed valve is failed closed.





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**ORGANIZATIONAL MAINTENANCE****PRINCIPLES OF OPERATION****COMPONENT LOCATOR****ENGINE FUEL SUPPLY SYSTEM**

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**Reference Material**

None

**Alphabetical Index****Subject****Page No.**

Engine Fuel Supply System Component Locator, Figure 1 ..... 2

**Record of Applicable Technical Directives**

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 IAFC 056	-	Fuel System Components Replacement and System Inspection (ECP-MDA- F/A-18-00158R1 and ECP-MDA- F/A-18-00160)	1 Jul 85	-
F/A-18 AFC 18	-	Incorporation of Fuel Turbine Boost Pump/ Sealing of Raised Baffle in Tanks 2 and 3 (ECP-MDA-F/A-18-00077C1/C2)	15 Jun 86	-
F/A-18 AFC 70	-	Incorporation of Motive Flow Boost Pump Pressure Switch (ECP-MDA-F/A-18-00158R2)	15 Jun 86	-

	NOMENCLATURE	INDEX NO.	REF DES
	BOOST INLET PRESSURE TRANSDUCER		
	LEFT	19	5MTP127
	RIGHT	18	5MTR128
	CONTROL CONVERTER C-10382/A	10	82A-F001
	CROSSFEED MANIFOLD	14	
	DIGITAL DATA COMPUTER NO. 1	6	83A-E001
	DIGITAL DISPLAY INDICATOR ID-2150/ASM-612	7	85A-G003
	ENGINE FUEL COUPLING CHECK VALVE	12	
	LEFT		5VAP639
	RIGHT		5VAR640
	ENGINE FUEL SHUTOFF VALVE	21	
	LEFT		5B-P072
	RIGHT		5B-R070
1	FUEL BOOST PRESSURE SWITCH	13	
	LEFT		5S-P113
	RIGHT		5S-P114
	FUEL CROSSFEED SHUTOFF VALVE	20	5B-P071
	FUEL GROUND TEST RECEPTACLE	26	5J-R135
	FUEL/OIL HEAT EXCHANGER CHECK VALVE	17	
	LEFT		5VAS523
	RIGHT		5VAT524
	FUEL TEMPERATURE SENSOR	16	
	LEFT		5A-P111
	RIGHT		5A-R112
	LEFT DIGITAL DISPLAY INDICATOR IP-1317/A	2	80A-H001
	LH ADVISORY AND THREAT WARNING INDICATOR PANEL	1	52A-H073
	LEFT ENGINE FIRE WARNING LIGHT		4DSH003
	MASTER CAUTION LIGHT		
	MOTIVE FLOW/BOOST PUMP	15	
	LEFT		5BAS515
	RIGHT		5BAT514
2	NO. 2 FUEL TANK ENGINE FUEL BOOST JET EJECTOR	22	5BAP599
3	NO. 2 FUEL TANK ENGINE FUEL TURBINE BOOST PUMP	23	5BAP679
2	NO. 3 FUEL TANK ENGINE FUEL BOOST JET EJECTOR	24	5BAP591
3	NO. 3 FUEL TANK ENGINE FUEL TURBINE BOOST PUMP	25	5BAR680
	NO. 4 RELAY PANEL ASSEMBLY	5	52A-N118
	LEFT ENGINE FUEL PRESSURE RELAY		5K-N154
	RIGHT ENGINE FUEL PRESSURE RELAY		5K-N155
	NO. 5 CIRCUIT BREAKER PANEL ASSEMBLY	9	5A-D092
	CROSSFEED FUEL VLV CIRCUIT BREAKER (ZONE A11)		5CBD065
	L/FUEL S/O VALVE CIRCUIT BREAKER (ZONE A12)		5CBD066
	R/FUEL S/O VALVE CIRCUIT BREAKER (ZONE A10)		5CBD064
	NO. 7 CIRCUIT BREAKER/RELAY PANEL ASSEMBLY	8	52A-C057
	FUEL PRESS CIRCUIT BREAKER (ZONE B1)		5CBC153
	RH ADVISORY AND THREAT WARNING INDICATOR PANEL	3	52A-J074
	RIGHT ENGINE FIRE WARNING LIGHT		4DSJ004
	SIGNAL DATA CONVERTER CV-3493/ASM-612	4	85A-N002
	SIGNAL DATA RECORDER RO-5081/ASM-612	11	85A-F001

Figure 1. Engine Fuel Supply System Component Locator (Sheet 1)

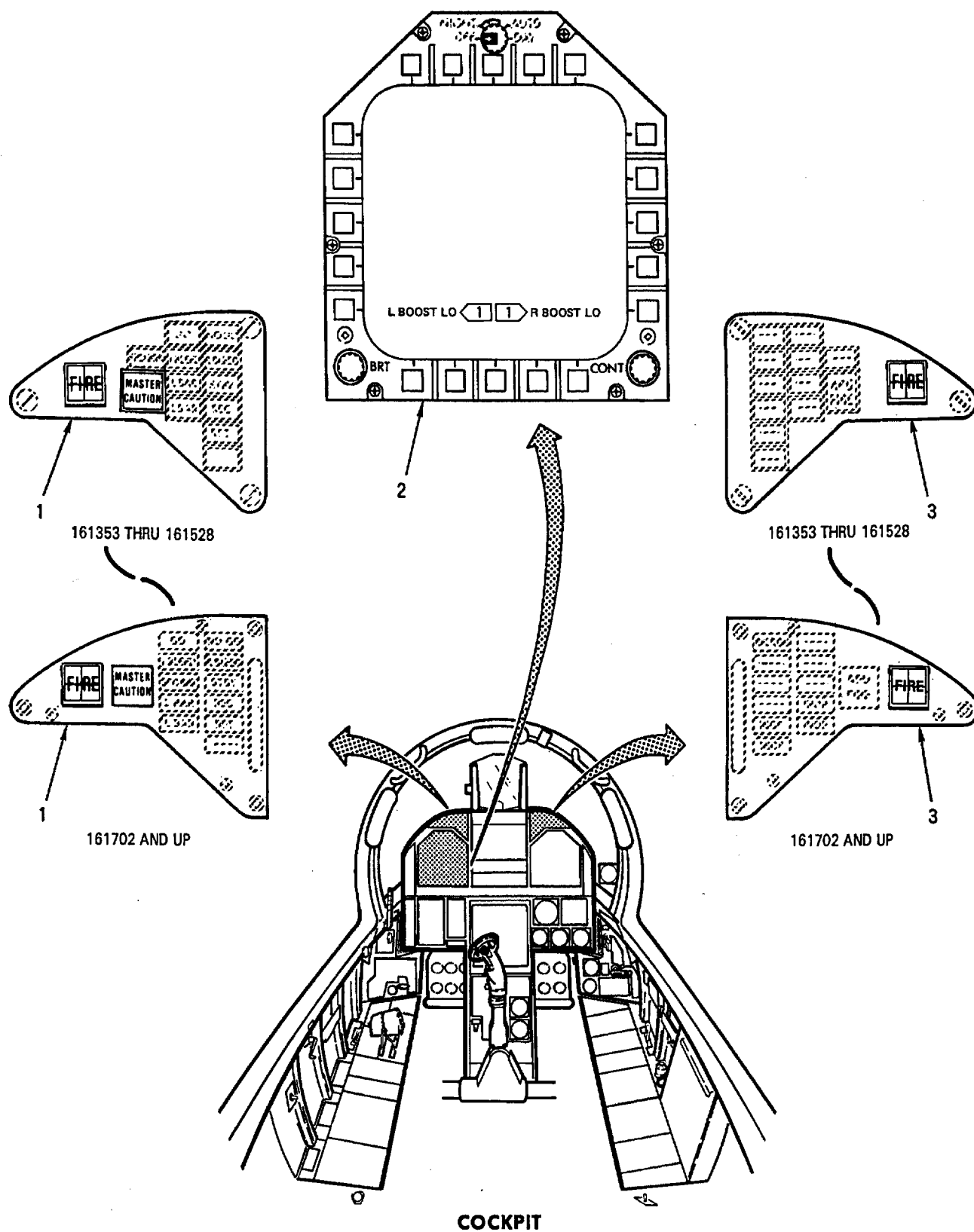


Figure 1. Engine Fuel Supply System Component Locator (Sheet 2)

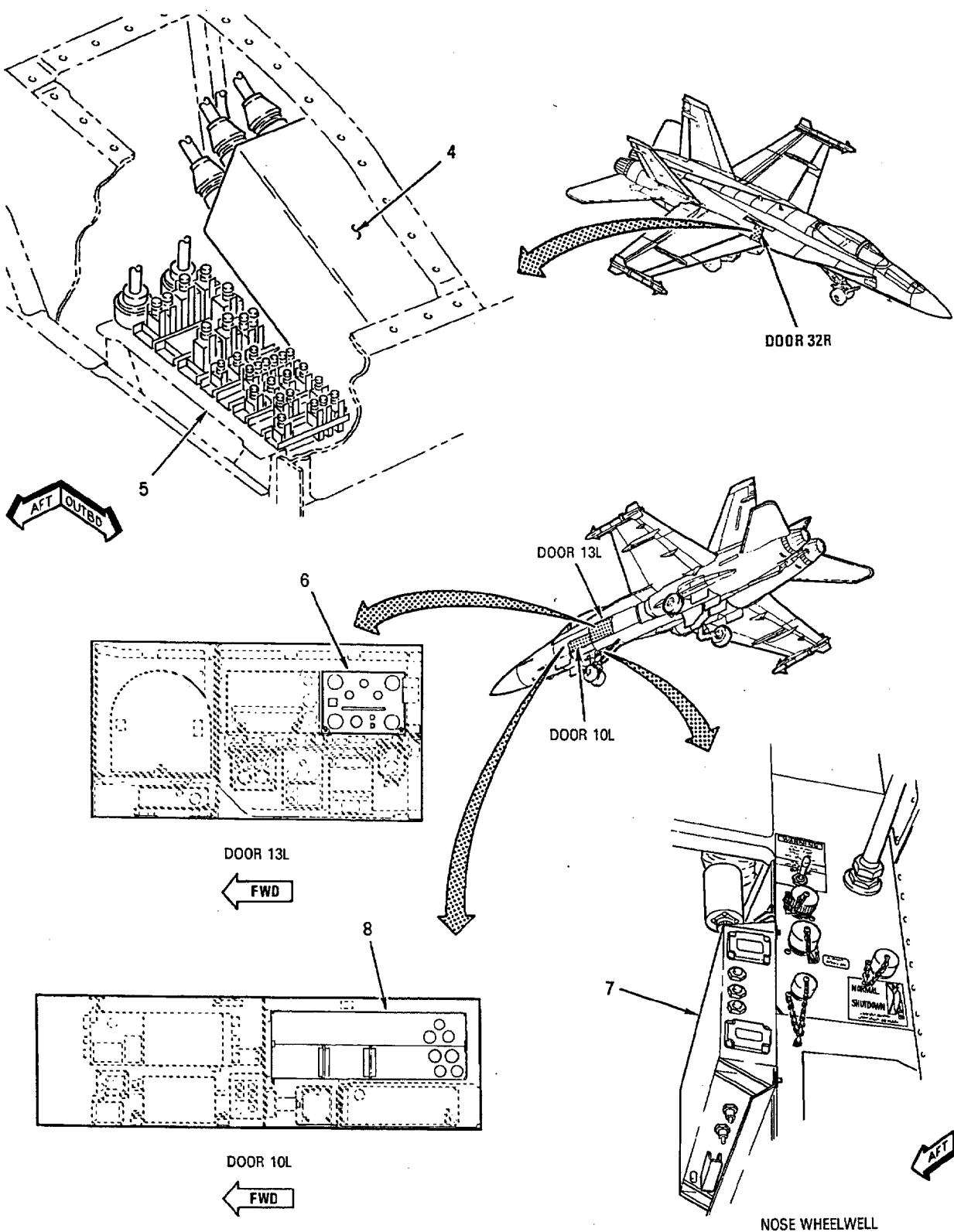


Figure 1. Engine Fuel Supply System Component Locator (Sheet 3)

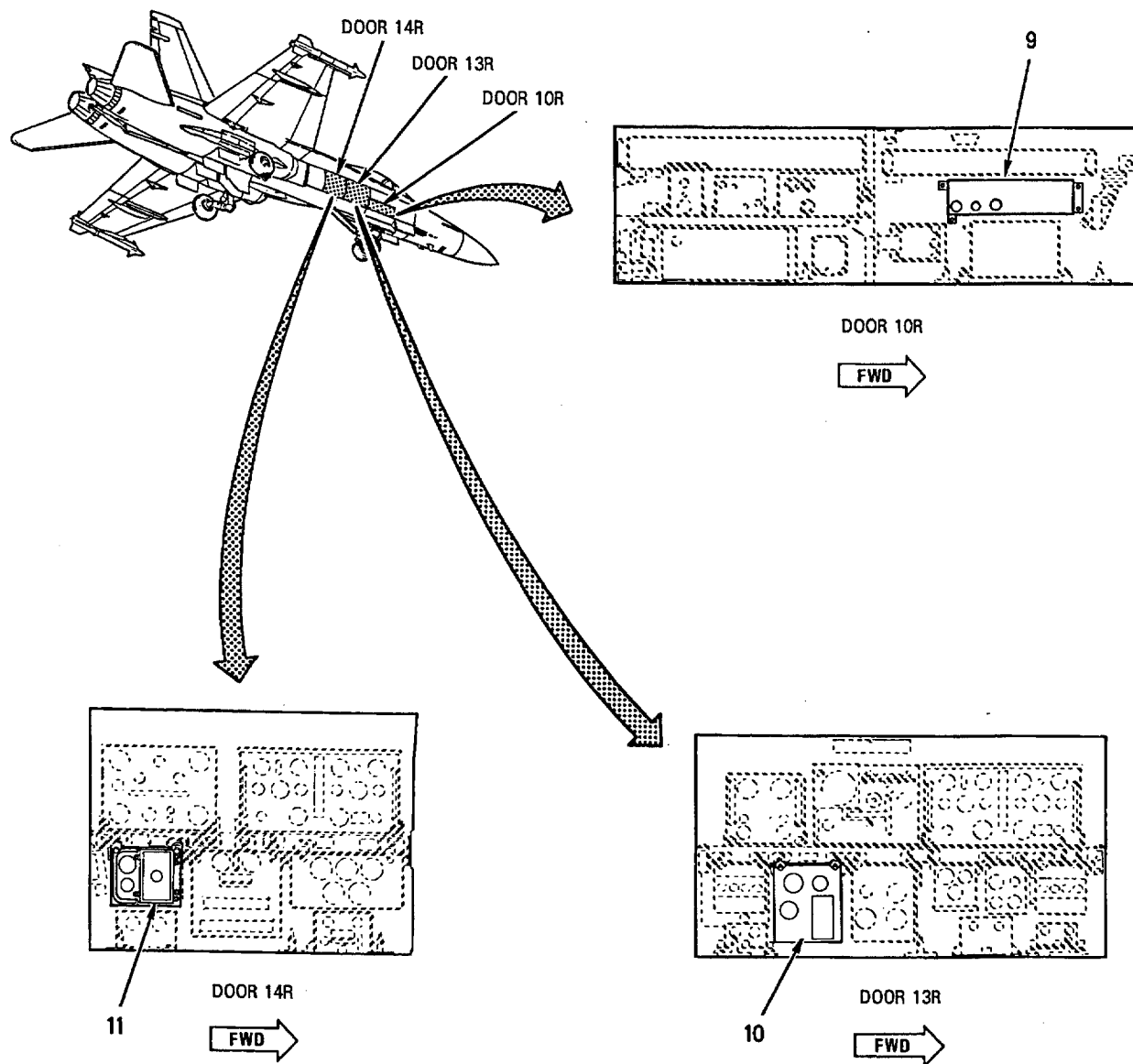
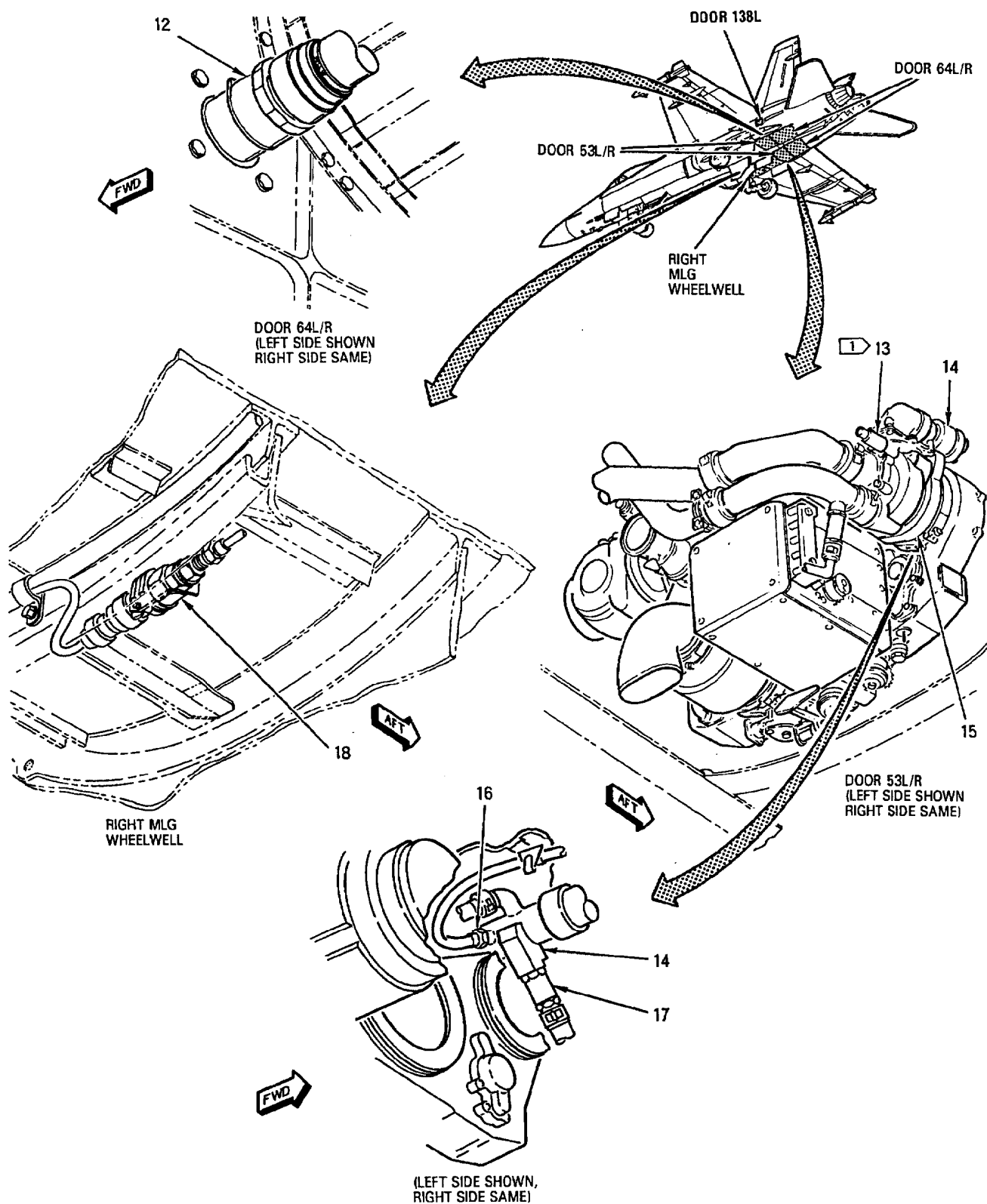
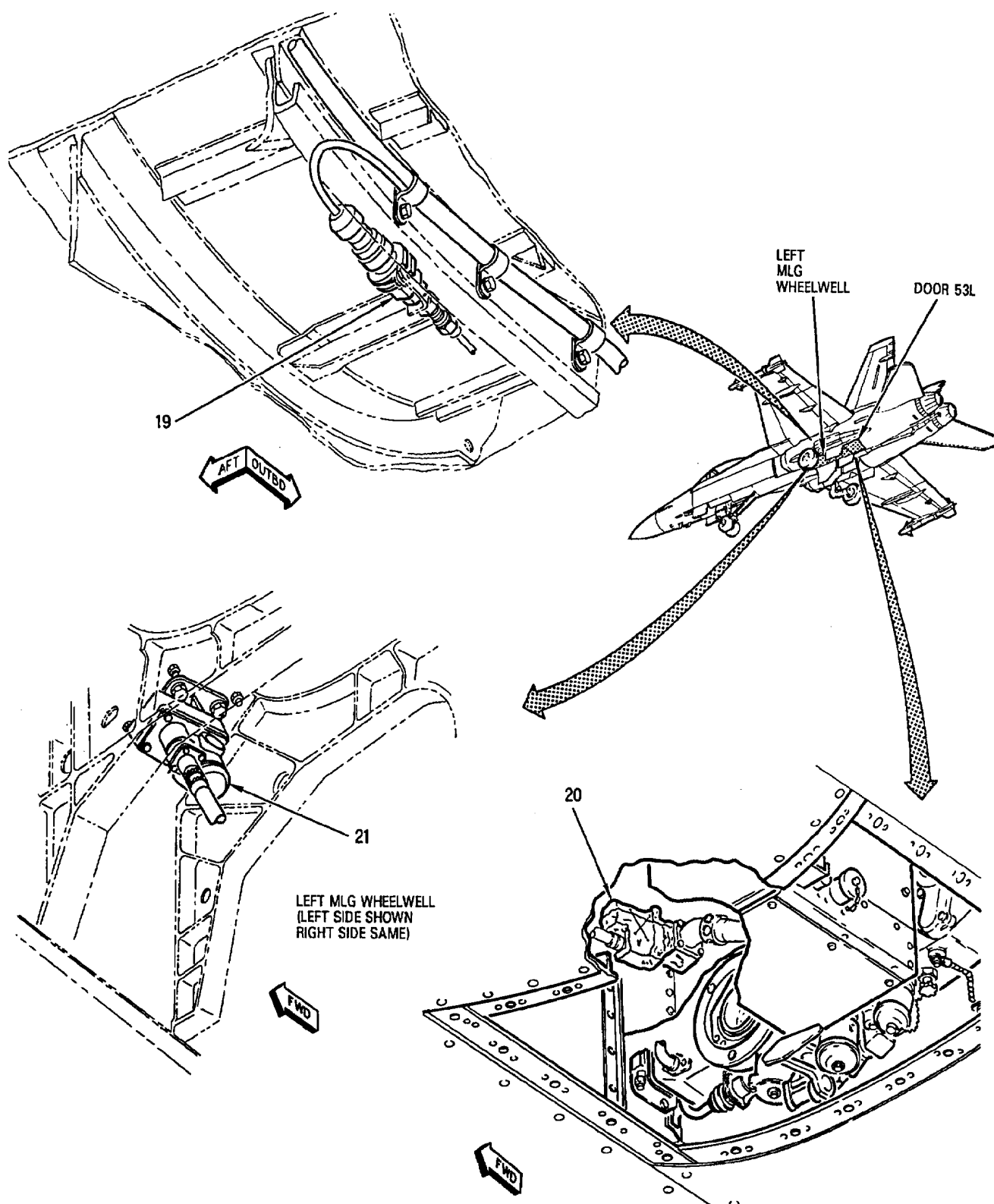


Figure 1. Engine Fuel Supply System Component Locator (Sheet 4)



18AC-460-10-(18-5)E

Figure 1. Engine Fuel Supply System Component Locator (Sheet 5)



18AC-460-10-(18-6)E

Figure 1. Engine Fuel Supply System Component Locator (Sheet 6)

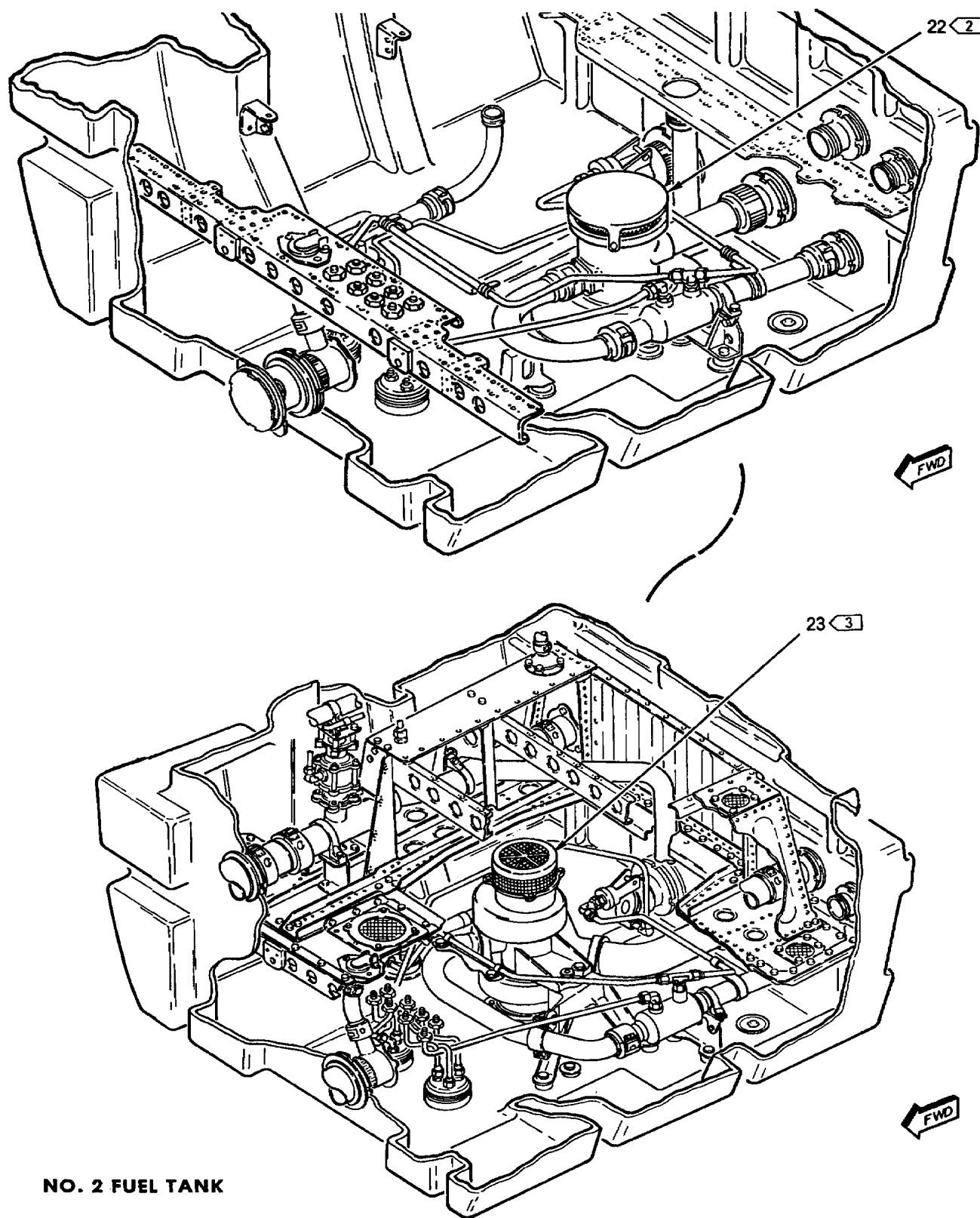
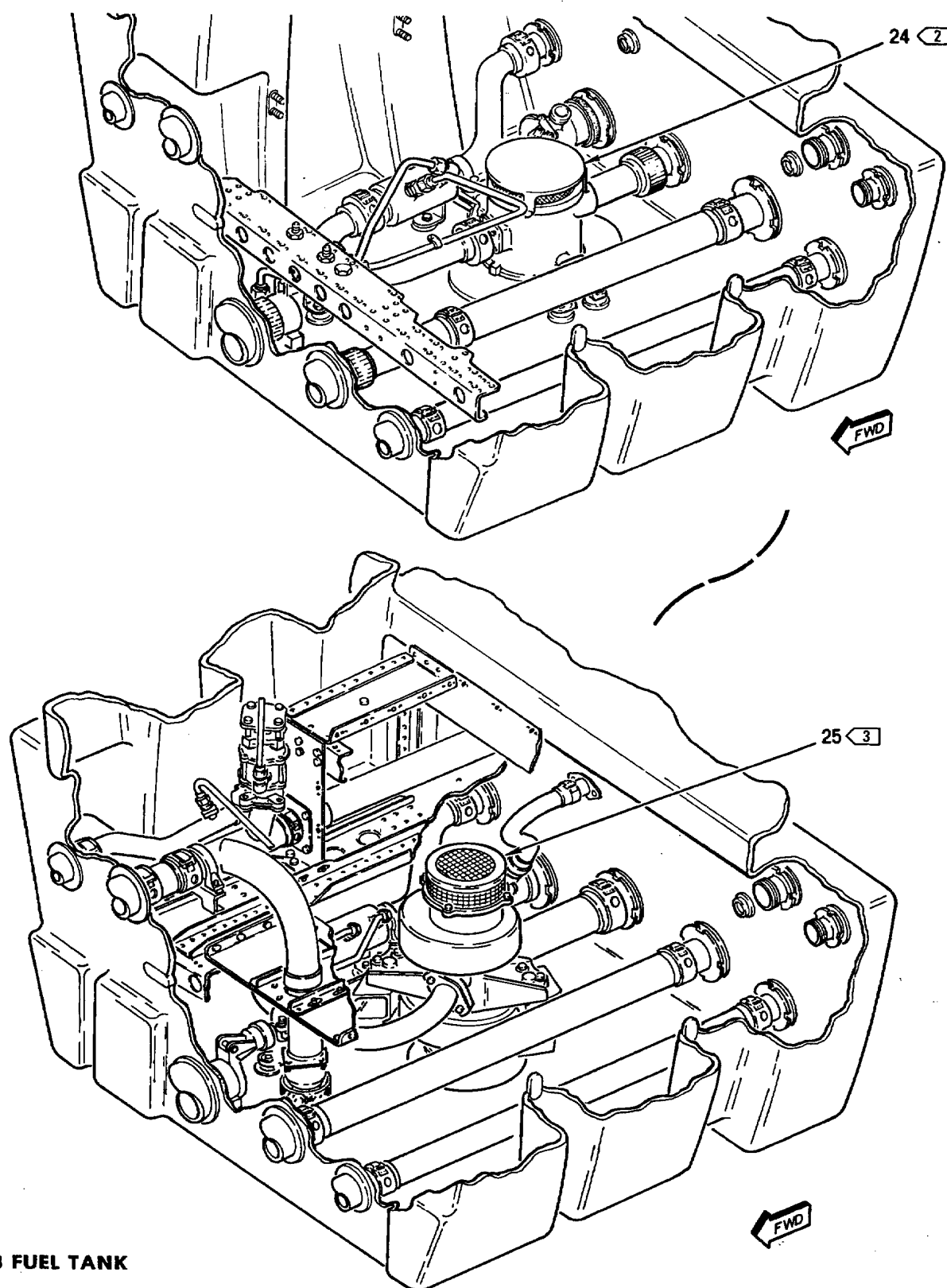


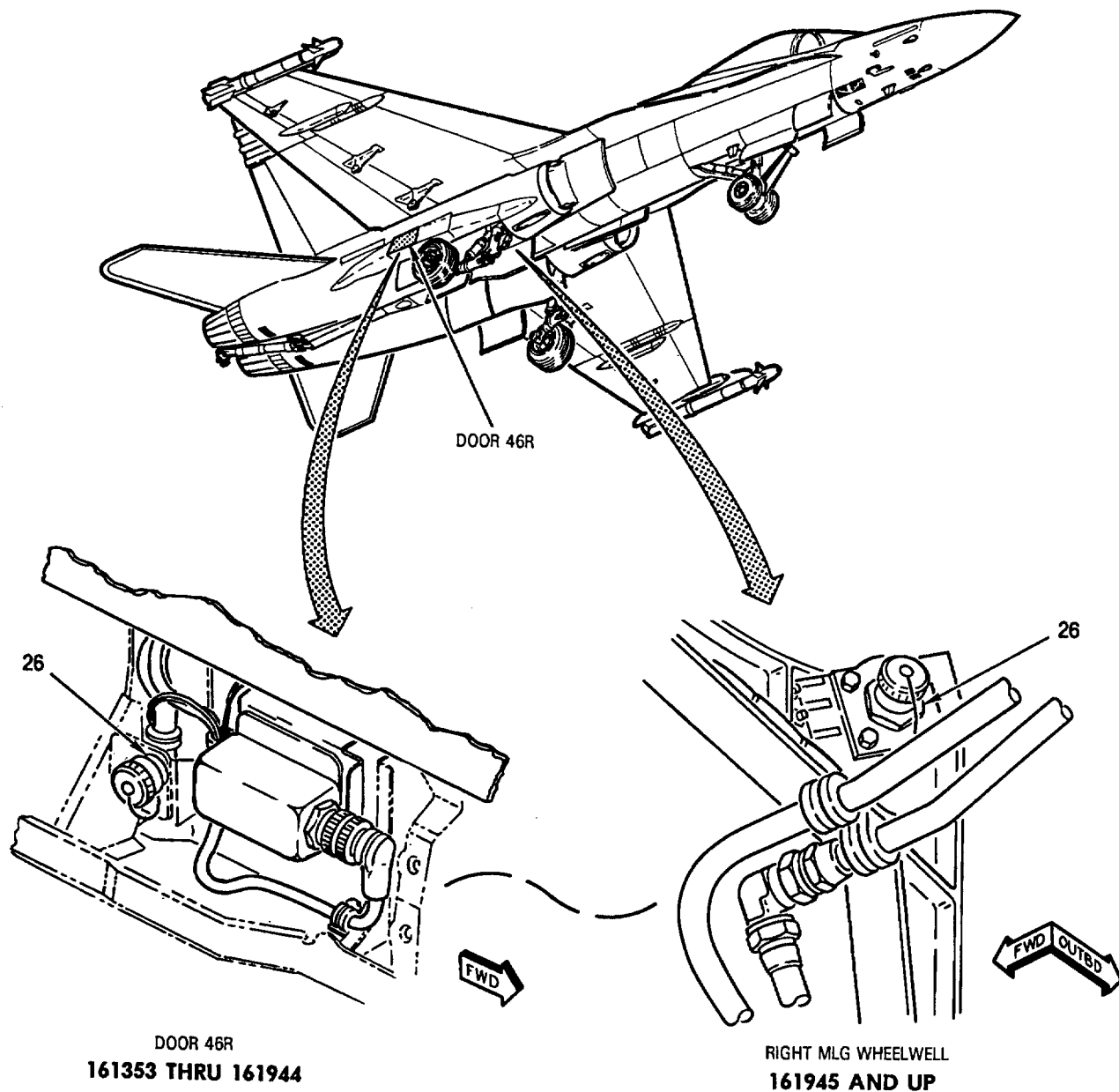
Figure 1. Engine Fuel Supply System Component Locator (Sheet 7)





NO. 3 FUEL TANK

Figure 1. Engine Fuel Supply System Component Locator (Sheet 8)



# LEGEND

- 1 163119 AND UP; ALSO 161353 THRU 161924 BEFORE F/A-18 IAFC 056 OR 161353 THRU 163118 AFTER F/A-18 AFC 70.
- 2 161353 THRU 161761 BEFORE F/A-18 AFC 18.
- 3 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 18.

18AC-460-10-(18-9)22

Figure 1. Engine Fuel Supply System Component Locator (Sheet 9)

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**ORGANIZATIONAL MAINTENANCE****PRINCIPLES OF OPERATION****SIMPLIFIED SCHEMATIC****ENGINE FUEL SUPPLY SYSTEM**

**This WP supersedes WP016 00, dated 15 January 1992**

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**Reference Material**

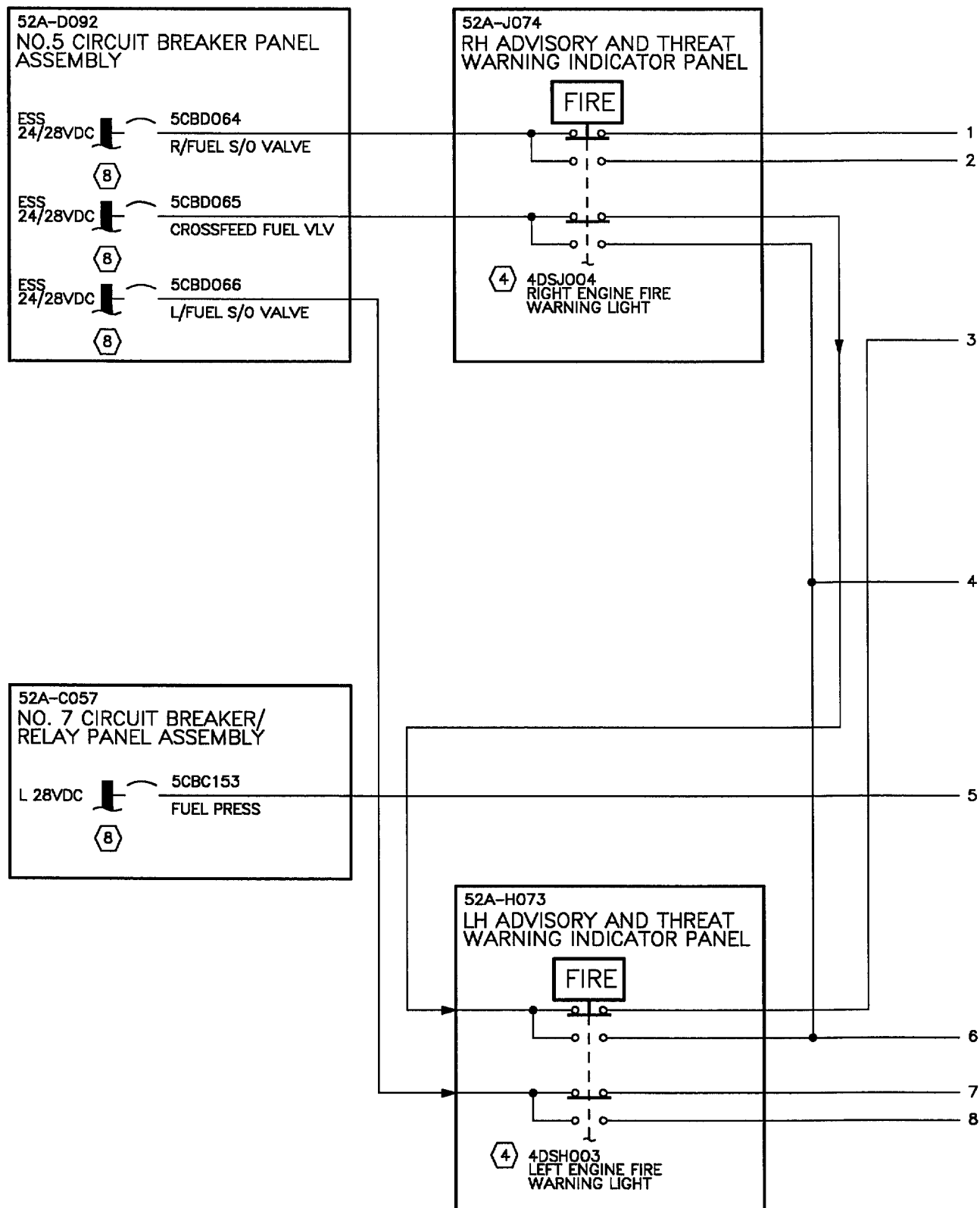
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**Alphabetical Index****Subject****Page No.**

Engine Fuel Supply System Simplified Schematic, Figure 1 . . . . . 2

**Record of Applicable Technical Directives**

<b>Type/ Number</b>	<b>Date</b>	<b>Title and ECP No.</b>	<b>Date Incorp.</b>	<b>Remarks</b>
F/A-18 IAFC-056	27 Mar 85	Fuel System Components Replacement and System Inspection (ECP-MDA-F/A-00158R1 and ECP-MDA-F/A-18-00160)	1 Jul 85	-
F/A-18 AFC 18	-	Incorporation of Fuel Turbine Boost Pump/ Sealing of Raised Baffle in Fuel Tanks 2 and 3 (ECP-MDA-F/A-18-00077)	15 Jun 86	-
F/A-18 AFC 70	-	Installation of Motive Flow Boost Pump Pres- sure Switch (ECP-MDA-F/A-18-00158R2)	15 Jun 86	-



18AC-460-10-(21-1)19-CATI

Figure 1. Engine Fuel Supply System Simplified Schematic (Sheet 1)

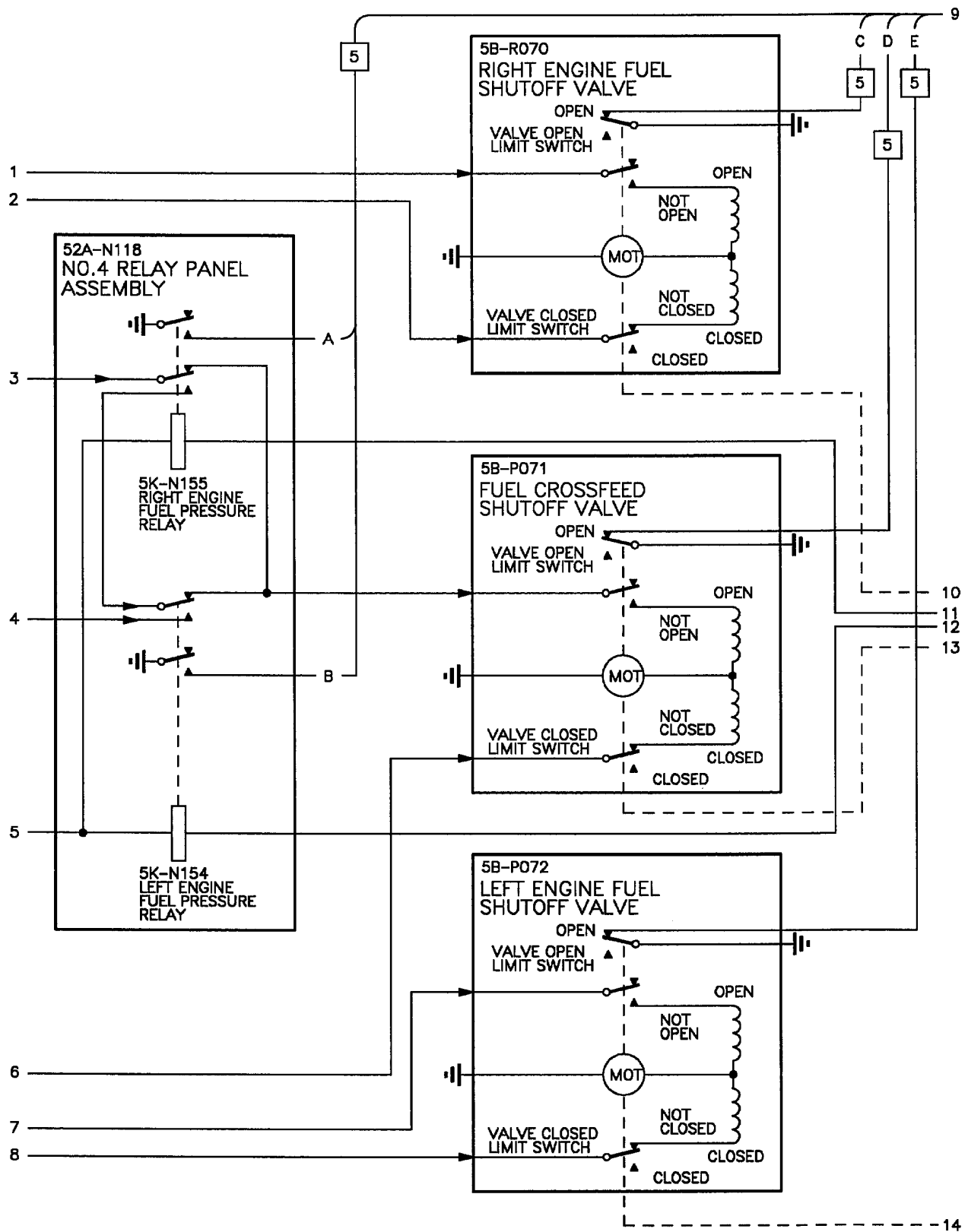
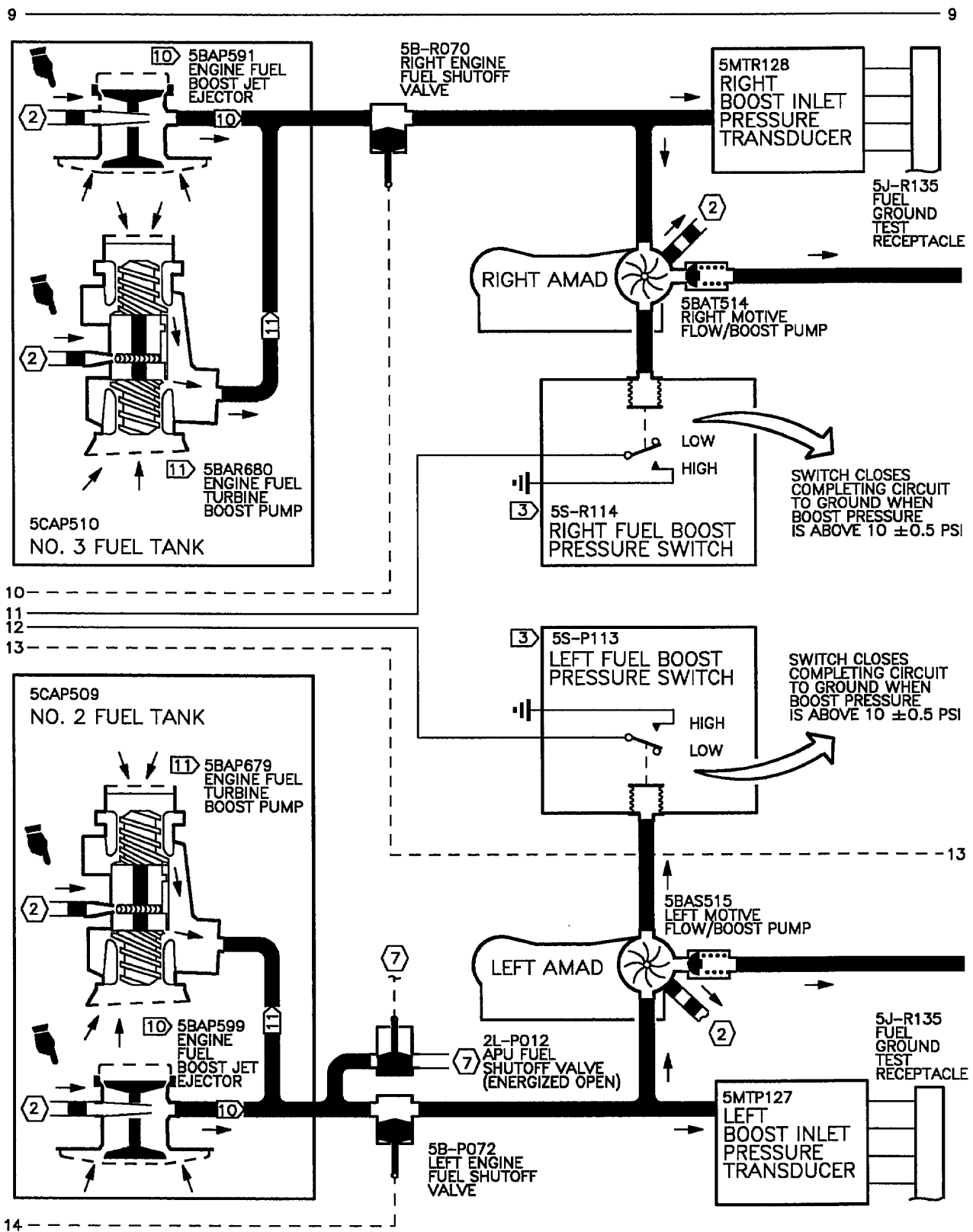


Figure 1. Engine Fuel Supply System Simplified Schematic (Sheet 2)



18AC-460-10-(21-3)23-CAT1

Figure 1. Engine Fuel Supply System Simplified Schematic (Sheet 3)

9

9

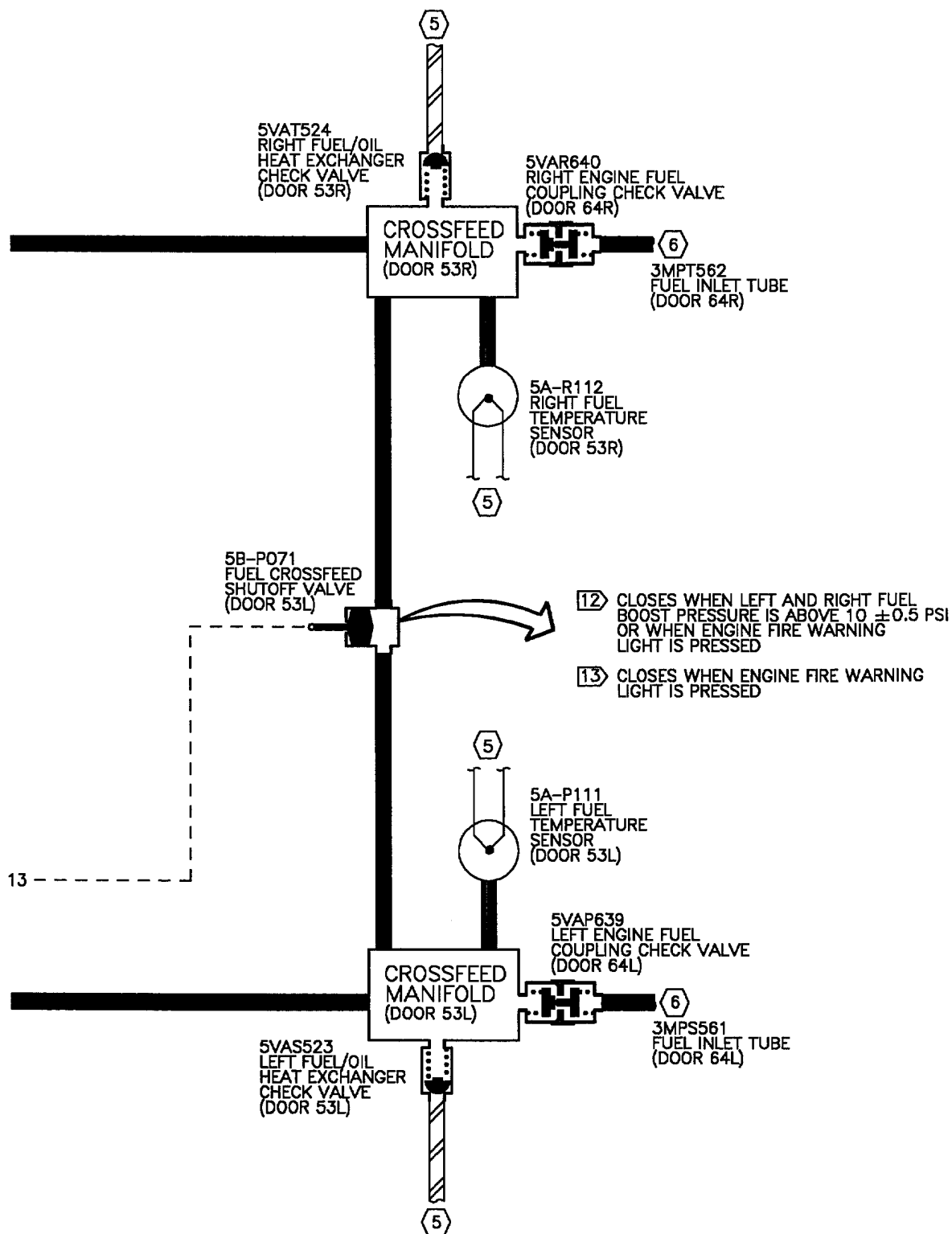
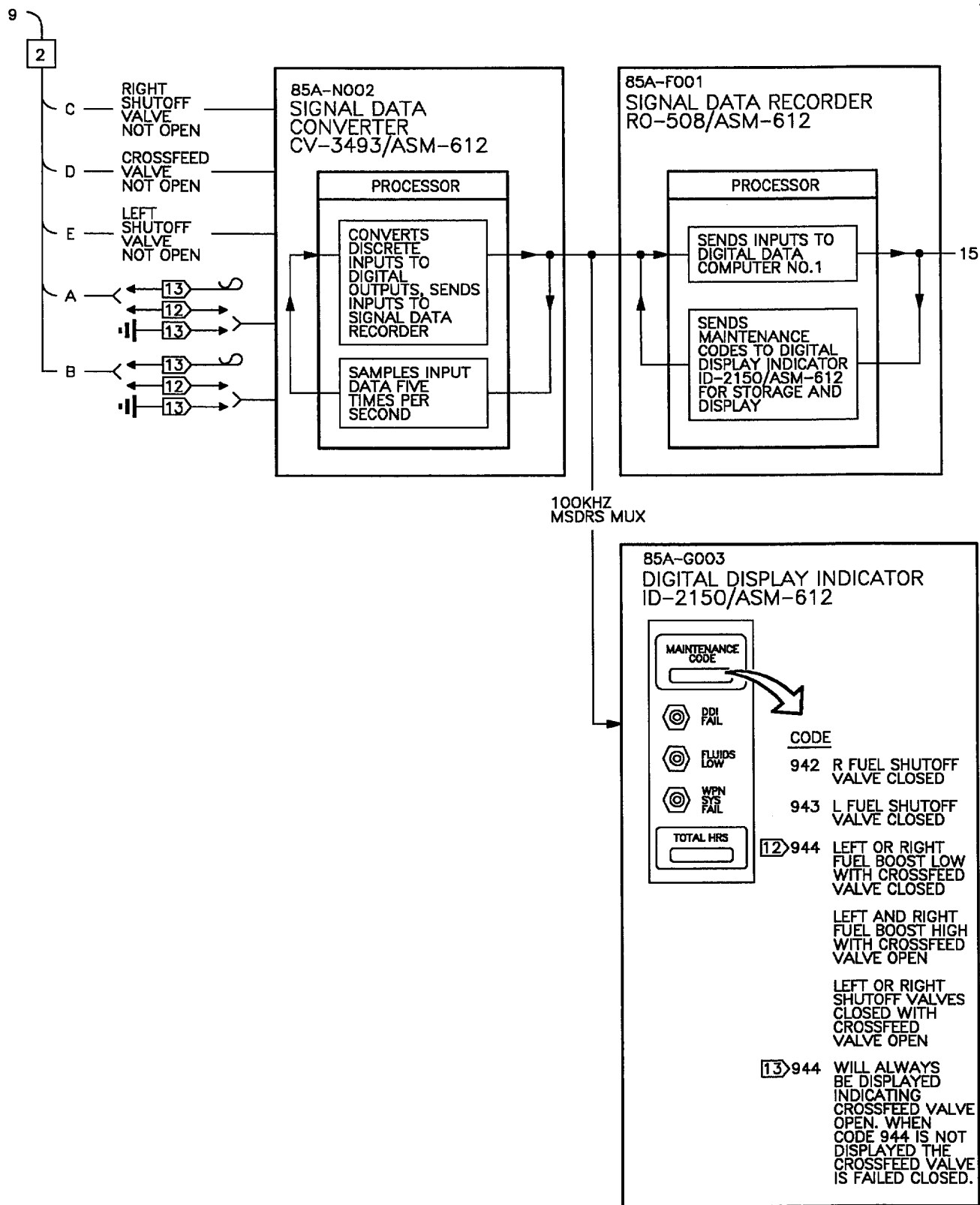


Figure 1. Engine Fuel Supply System Simplified Schematic (Sheet 4)

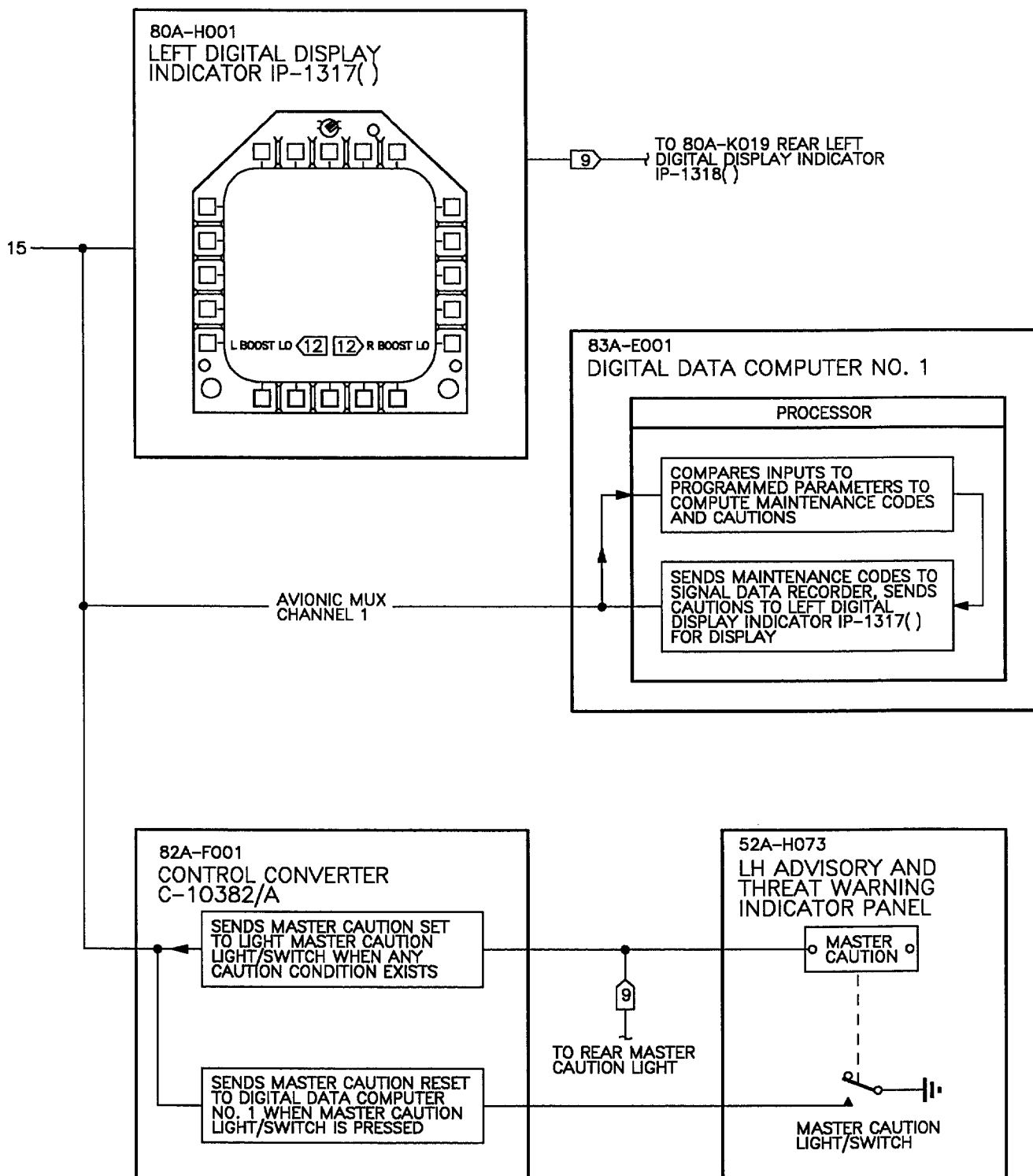
18AC-460-10-(21-4)22-CATI



18AC-460-10-(21-5)22-CATI

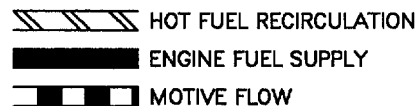
Figure 1. Engine Fuel Supply System Simplified Schematic (Sheet 5)



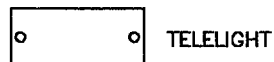


**Figure 1. Engine Fuel Supply System Simplified Schematic (Sheet 6)**

## LEGEND



### 1. NONSTANDARD SYMBOLS:



- ② INTERNAL FUEL TRANSFER SYSTEM SIMPLIFIED SCHEMATIC, WP014 00.
- ③ 163119 AND UP; ALSO 161353 THRU 161924 BEFORE F/A-18 IAF 056 OR 161353 THRU 163118 AFTER F/A-18 AFC 70 FUEL BOOST PRESSURE SWITCH IS INSTALLED AND ELECTRICAL CONNECTOR CONNECTED.
- ④ FIRE EXTINGUISHING SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-240-100, WP011 00.
- ⑤ HOT FUEL RECIRCULATION SYSTEM SIMPLIFIED SCHEMATIC, WP018 00.
- ⑥ BASIC ENGINE SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-270-100, WP005 00.
- ⑦ APU START SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-240-100, WP004 00.
- ⑧ POWER DISTRIBUTION SIMPLIFIED SCHEMATIC, A1-F18AC-420-100, WP005 00.
- ⑨ F/A-18B.
- ⑩ 161353 THRU 161761 BEFORE F/A-18 AFC 18.
- ⑪ 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 18.
- ⑫ 163119 AND UP; ALSO 161353 THRU 161924 BEFORE F/A-18 IAF 056 OR 161353 THRU 163118 AFTER F/A-18 AFC 70.
- ⑬ 161353 THRU 161924 AFTER F/A-18 IAF 056 AND 161925 THRU 163118 BEFORE F/A-18 AFC 70.

**Figure 1. Engine Fuel Supply System Simplified Schematic (Sheet 7)**

## ORGANIZATIONAL MAINTENANCE

## PRINCIPLES OF OPERATION

## DESCRIPTION AND OPERATION

## FUEL DUMP SYSTEM

## Reference Material

Fuel System .....	A1-F18AC-460-100
Fuel Quantity Gaging System Description and Operation .....	WP021 00
Fuel Quantity Low Level Warning System Description and Operation .....	WP023 00
Maintenance Status Display and Recording System .....	A1-F18AC-580-100
Operation .....	WP005 00
Communication, TACAN, ADF, Electronic Altimeter and IFF System .....	A1-F18AC-600-100
Intercommunication and Audio System Description and Operation .....	WP014 00
Mission Computer System .....	A1-F18AC-741-100
Description System and Component .....	WP003 00
Multipurpose Display Group .....	A1-F18AC-745-100
Description .....	WP003 00

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Component Operation .....	3
System Operation .....	3

## Record of Applicable Technical Directives

None

## 1. DESCRIPTION.

2. **SYSTEM DESCRIPTION.** All fuel aboard the aircraft, except 800  $\pm$ 100 pounds of fuel in each feed tank, can be dumped inflight for reduction of weight. The system can be preset (BINGO) to stop fuel dumping at any quantity above low level warning (WP023 00).

3. **COMPONENT DESCRIPTION.** The fuel dump system components shown in WP017 01 and WP017 02 are described in paragraphs below. For fuel quantity gaging intermediate device description, see WP021 00.

4. **Fuel Dump Valve.** The fuel dump valve is an environmentally sealed, explosion proof motor operated (28vdc) butterfly valve. The dump valve motor is mounted on the dorsal deck above tank 4. The butterfly valve is located inside tank 4 and mates with the motor. The dump valve allows a means of dumping fuel while inflight, to reduce aircraft weight.

5. **Dump Line Flame Arrestors.** The dump fuel line flame arrestors are located in the left and right vertical stabilizers. The flame arrestors prevent flames from entering the fuel dump line.

6. **Dump Line Automatic Drain Valve.** The dump line automatic drain valve in the vent tank drains fuel and condensation from the dump lines in the vertical stabilizers.

7. **RELATED SYSTEMS.** Systems related to the fuel dump system are listed below.

8. **Maintenance Status Display and Recording System (MSDRS).** The maintenance status display and recording system receives inputs from the fuel system through the signal data converter and recorder. The MSDRS signal data recorder sends data to the mission computer system for processing. If the mission computer system detects a fuel system failure, it sends the applicable maintenance code to the MSDRS signal data recorder which sends it to the nose wheelwell Digital Display Indicator ID-2150/ASM-612 for storage and display (A1-F18AC-580-100, WP005 00).

9. **Mission Computer System.** The mission computer system receives fuel system data from the MSDRS. The mission computer system digital data computer no. 1 processes the data to determine when a fuel system failure or caution condition occurs. If a failure occurs, digital data computer no. 1 sends the applicable maintenance code to the MSDRS for storage and display. If a caution condition occurs, digital data computer no. 1 sends the caution message to the multipurpose display group for display and, if applicable, to the intercommunication and audio system for voice alert. The mission computer system control converter lights the MASTER CAUTION light on the LH advisory and threat warning indicator panel when a caution condition occurs (A1-F18AC-741-100, WP003 00).

10. **Multipurpose Display Group.** If the mission computer system detects a fuel system caution condi-

tion, it sends the caution message to the multipurpose display group. The left Digital Display Indicator IP-1317( ) and on F/A-18B, the rear left Digital Display Indicator IP-1318( ) receive and display the caution messages (A1-F18AC-745-100, WP003 00).

11. **Intercommunication and Audio System.** The intercommunication and audio system alert the pilot via the headset. An audible "bingo" or "fuel low" alerts the pilot when a caution occurs (A1-F18AC-600-100, WP014 00).

12. **SYSTEM CONTROLS AND INDICATORS.** Controls and indicators of the fuel dump system are listed below.

13. **MASTER CAUTION Light.** The yellow MASTER CAUTION light is located on the LH advisory and threat warning indicator panel. The light indicates a fuel system caution/advisory requiring attention but no immediate action. Fuel system cautions/advisories are displayed on left DDI or caution light indicator panel.

14. **Digital Display Indicator IP-1317( ), IP-1318( ).** BINGO and DUMP OPEN caution displays will appear on left Digital Display Indicator IP-1317( ) in the cockpit and on F/A-18B, left Digital Display Indicator IP-1318( ) in the rear cockpit. BINGO caution display appears if fuel amount reaches BINGO fuel setting. DUMP OPEN caution display appears if dump valve is open when dump switch is set to off.

15. **Digital Display Indicator ID-2150/ASM-612.** The Digital Display Indicator ID-2150/ASM-612 in the nose wheelwell stores and displays a 941 - fuel dump fail open failure code.

16. **FUEL QTY (Fuel Quantity) Indicator - Bingo Set Selector/Bug.** The bingo set selector can be used to stop fuel dump at any desired level above low level warning (800  $\pm$ 100 pounds in either feed tank). Turning the set selector moves the bug across the INT pounds scale. When internal fuel quantity reaches the bug, BINGO is displayed on the cockpit left Digital Display Indicator IP-1317( ) and the "Bingo" voice alert cautions the pilot about his fuel state.

17. **DUMP Switch.** When the magnetically held DUMP switch on FUEL system control panel is set

to ON with weight-off-wheels, the motor driven dump valve in tank 4 opens and fuel dumps. DUMP switch will automatically shut OFF when fuel quantity reaches low level warning point ( $800 \pm 100$  pounds) or BINGO fuel setting.

## 18. OPERATION.

19. **COMPONENT OPERATION.** An operational description for the fuel quantity gaging intermediate device is given in WP021 00.

20. **Fuel Dump Valve.** When energized by 28vdc with weight-off-wheels, this fuel dump valve motor rotates the butterfly valve open. As the motor opens the butterfly valve, the valve closed limit switch is reset and the valve open limit switch deenergizes the motor in the open position. When energized closed, the motor closes the butterfly valve. As the motor closes the butterfly valve, the valve open limit switch is reset and the valve closed limit switch deenergizes the motor with the butterfly, in the closed position.

21. **SYSTEM OPERATION.** Fuel dump is started by actuation of a magnetically held fuel DUMP switch which electrically operates the dump valve with weight-off-wheels and fuel amount more than BINGO fuel setting and above fuel low level warning ( $800 \pm 100$  pounds in either feed tank).

22. The dump valve is in the fuselage transfer line in tank 4 (the valve motor is on the dorsal deck). Pressure for fuel dump comes from the fuselage transfer ejectors in tanks 1 and 4. Fuel from both ejectors discharges aft through outlets on the trailing edges of both vertical stabilizers. Flame arrestors at the dump outlets prevent flames from spreading upstream to the

fuel tanks. Fuel from the transfer ejectors also keeps the feed tanks full during fuel dump.

23. Fuel will continue to dump from tanks 1 and 4 until they are empty or the BINGO fuel setting is arrived at (if above feed tank level). When tanks 1 and 4 empty, the motive flow pilot valves close and shut off their respective transfer shutoff valves. This prevents feed tank fuel, which is being used for hot fuel recirculation, from being dumped overboard.

24. A fuel low level relay will automatically stop fuel dump any time fuel level in either feed tank depletes below  $800 \pm 100$  pounds.

25. After fuel dump stops, all fuel remaining in the dump lines is drained into the vent tank through an automatic drain valve.

26. **Fuel Dump System Cautions/Codes.** Cautions are displayed on left cockpit DDI IP-1317( ), IP-1318( ) and light the MASTER CAUTION light. Codes are displayed on nose wheelwell DDI ID-2150/ASM-612. Fuel dump system cautions/codes are displayed below.

27. DUMP OPEN. Caution that indicates dump valve is in an uncommanded open position.

28. BINGO. Caution/voice alert that indicates total fuel quantity is below the bingo level set by the pilot. Bingo can be used to stop fuel dump at any predetermined level above low level warning.

29. Code 941. Code that indicates fuel dump valve is open when commanded closed.



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**ORGANIZATIONAL MAINTENANCE****PRINCIPLES OF OPERATION****COMPONENT LOCATOR****FUEL DUMP SYSTEM**

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**Reference Material**

None

**Alphabetical Index****Subject****Page No.**

Fuel Dump System Component Locator, Figure 1 ..... 2

**Record of Applicable Technical Directives**

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 AFC 53	-	Elimination of Tanks 1 and 4 Sneak Circuit, Tank 4 Motive Flow Shutoff Valve, and Raised Inverted Baffle (ECP-MDA-F/A-18-00055/C1)	15 Jun 86	-
F/A-18 AFC 41	-	Throttle Thrust Sensitivity, Reduction of (ECP- MDA-F/A-18-00054C1)	1 Nov 86	-

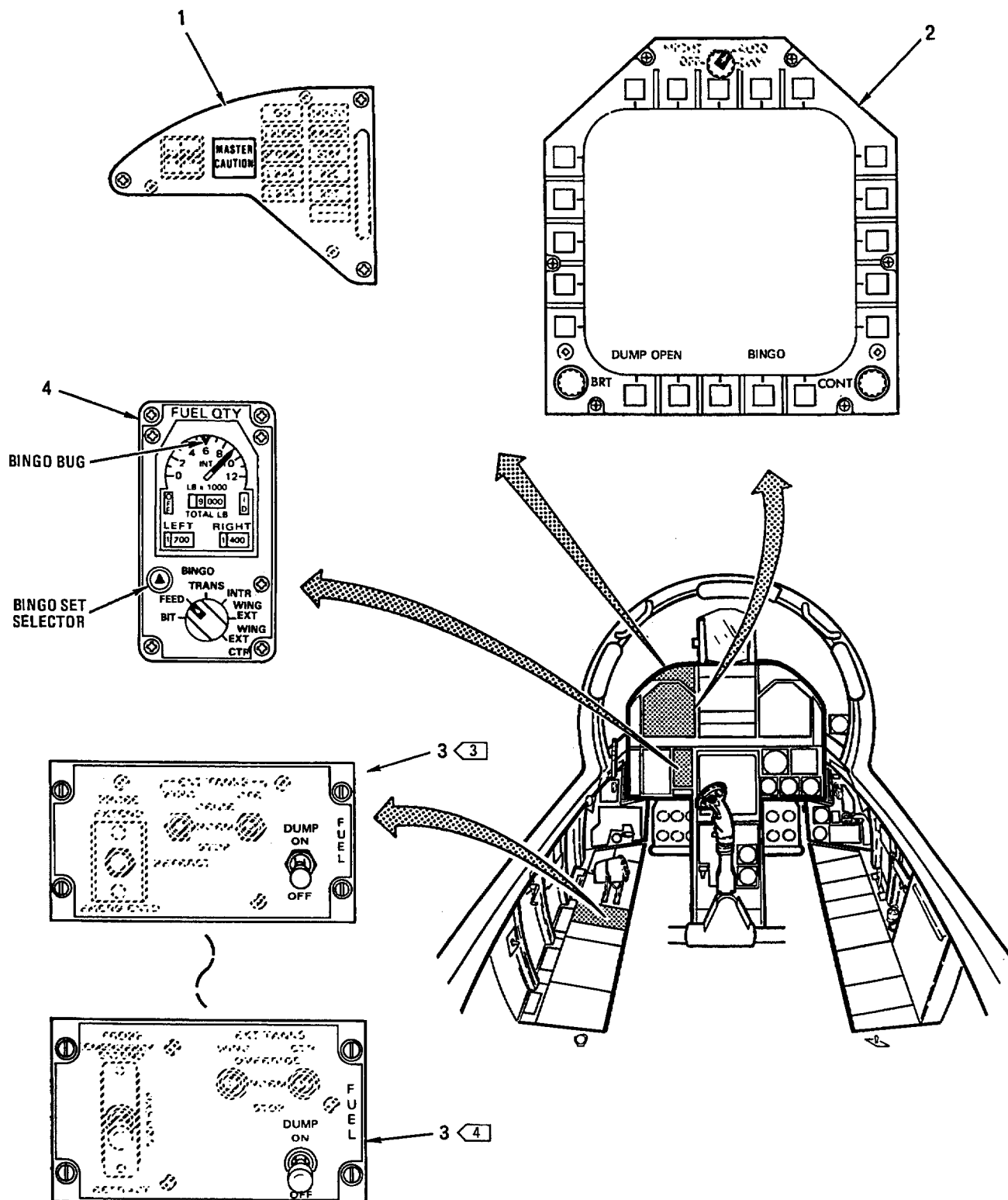


Figure 1. Fuel Dump System Component Locator (Sheet 1)



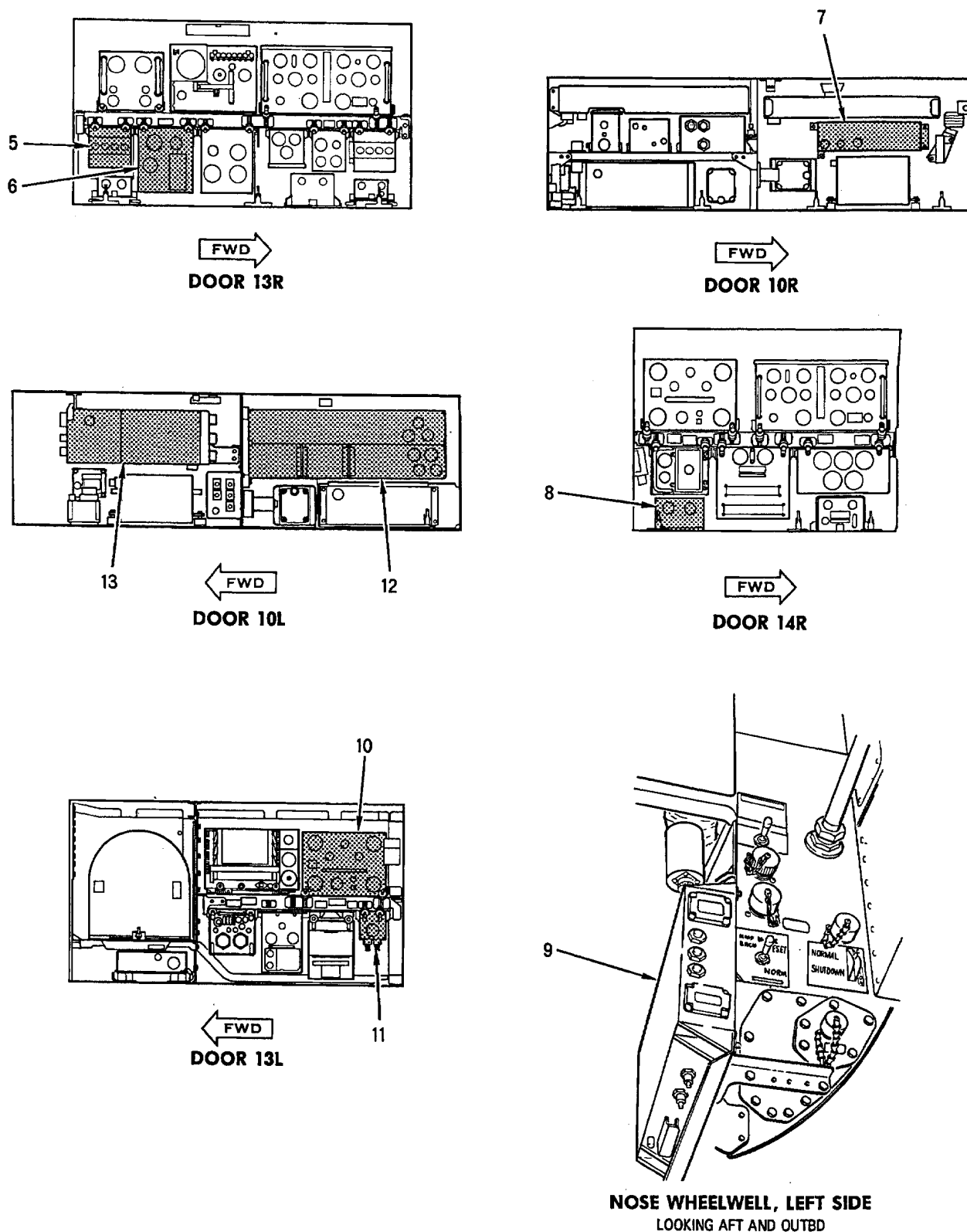


Figure 1. Fuel Dump System Component Locator (Sheet 2)

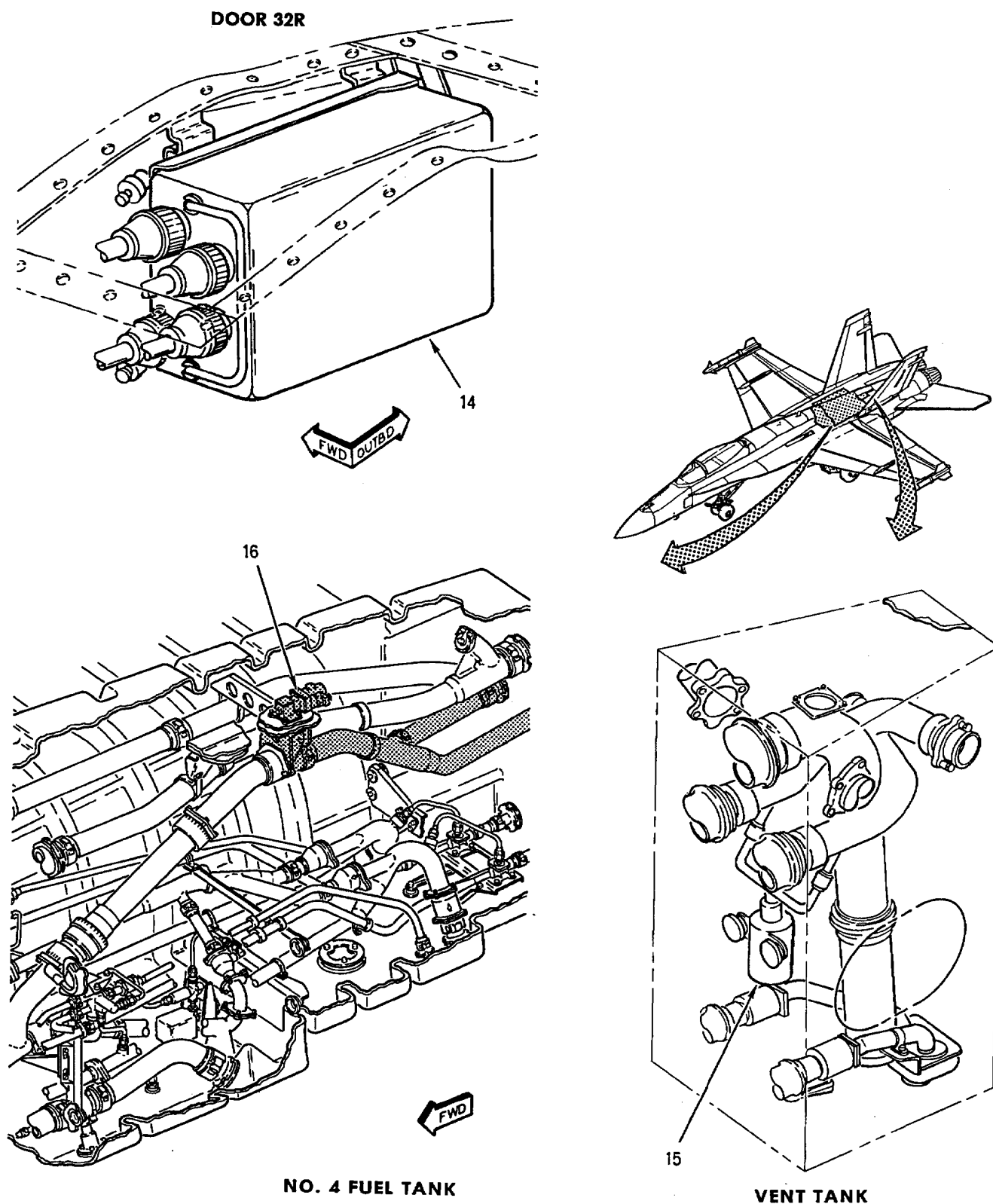


Figure 1. Fuel Dump System Component Locator (Sheet 3)

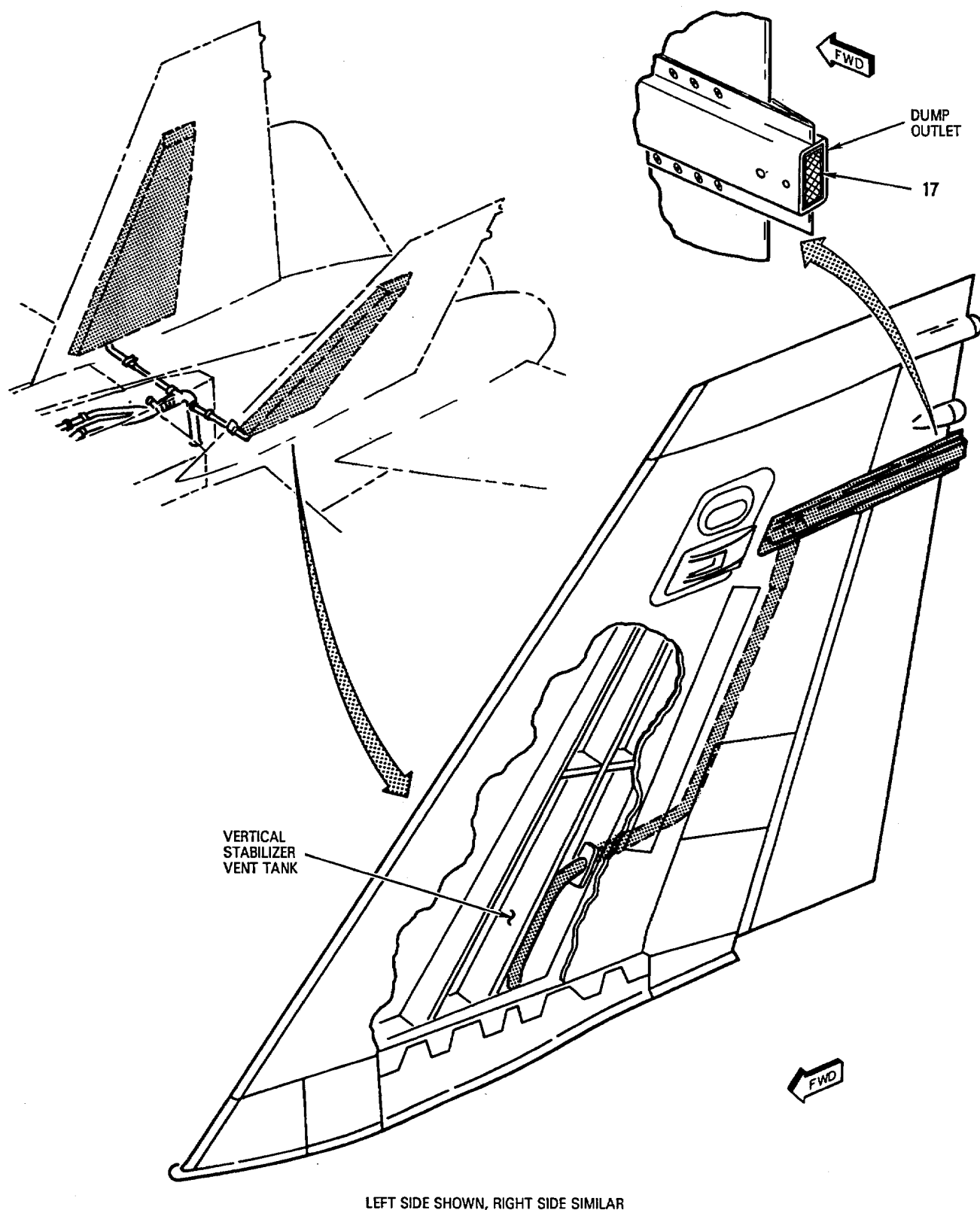


Figure 1. Fuel Dump System Component Locator (Sheet 4)

## LEGEND

1	161353 THRU 161761 BEFORE F/A-18 AFC 53.
2	161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 53.
3	161702 AND UP; ALSO 161353 THRU 161528 AFTER F/A-18 AFC 41.
4	161353 THRU 161528 BEFORE F/A-18 AFC 41.

Nomenclature	Index No.	Ref Des
CONTROL CONVERTER C-10382/A	6	82A-F001
DIGITAL DATA COMPUTER NO. 1	10	83A-E001
DIGITAL DISPLAY INDICATOR ID-2150/ASM-612	9	85A-G003
DUMP LINE AUTOMATIC DRAIN VALVE	15	8VAS518
FUEL DUMP LINE FLAME ARRESTOR LEFT RIGHT	17	5MPS502 5MPT503
FUEL DUMP VALVE	16	5B-P069
FUEL SYSTEM CONTROL PANEL DUMP SWITCH	3	5A-H027 5S-H067
FUEL QUANTITY GAGING INTERMEDIATE DEVICE	8	5A-F014
FUEL QTY INDICATOR	4	5A-H013
LEFT DIGITAL DISPLAY INDICATOR IP-1317( )	2	80A-H001
LH ADVISORY AND THREAT WARNING INDICATOR PANEL	1	52A-H073
NO. 3 RELAY PANEL ASSEMBLY 1 BINGO FUEL RELAY LMG WOW RELAY NO. 2	11	52A-E059 5K-E068 12K-E018
NO. 5 CIRCUIT BREAKER PANEL ASSEMBLY FUEL DUMP CIRCUIT BREAKER	7	52A-D092 5CBD063
NO. 7 CIRCUIT BREAKER/RELAY PANEL 2 BINGO FUEL RELAY 3 FUEL LOW LEVEL TIME DELAY RELAY	12	52A-C057 5K-C068 5K-C147
NO. 8 CIRCUIT BREAKER/RELAY PANEL 2 FUEL LOW LEVEL RELAY NO. 2	13	52A-C159 5K-C052
SIGNAL DATA CONVERTER CV-3493/ASM-612	14	85A-N002

Figure 1. Fuel Dump System Component Locator (Sheet 5)

Nomenclature	Index No.	Ref Des
SIGNAL DATA RECORDER RO 508/ASM-612	5	85A-F001

**Figure 1. Fuel Dump System Component Locator (Sheet 6)**



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**ORGANIZATIONAL MAINTENANCE****PRINCIPLES OF OPERATION****SIMPLIFIED SCHEMATIC****FUEL DUMP SYSTEM**

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**Reference Material**

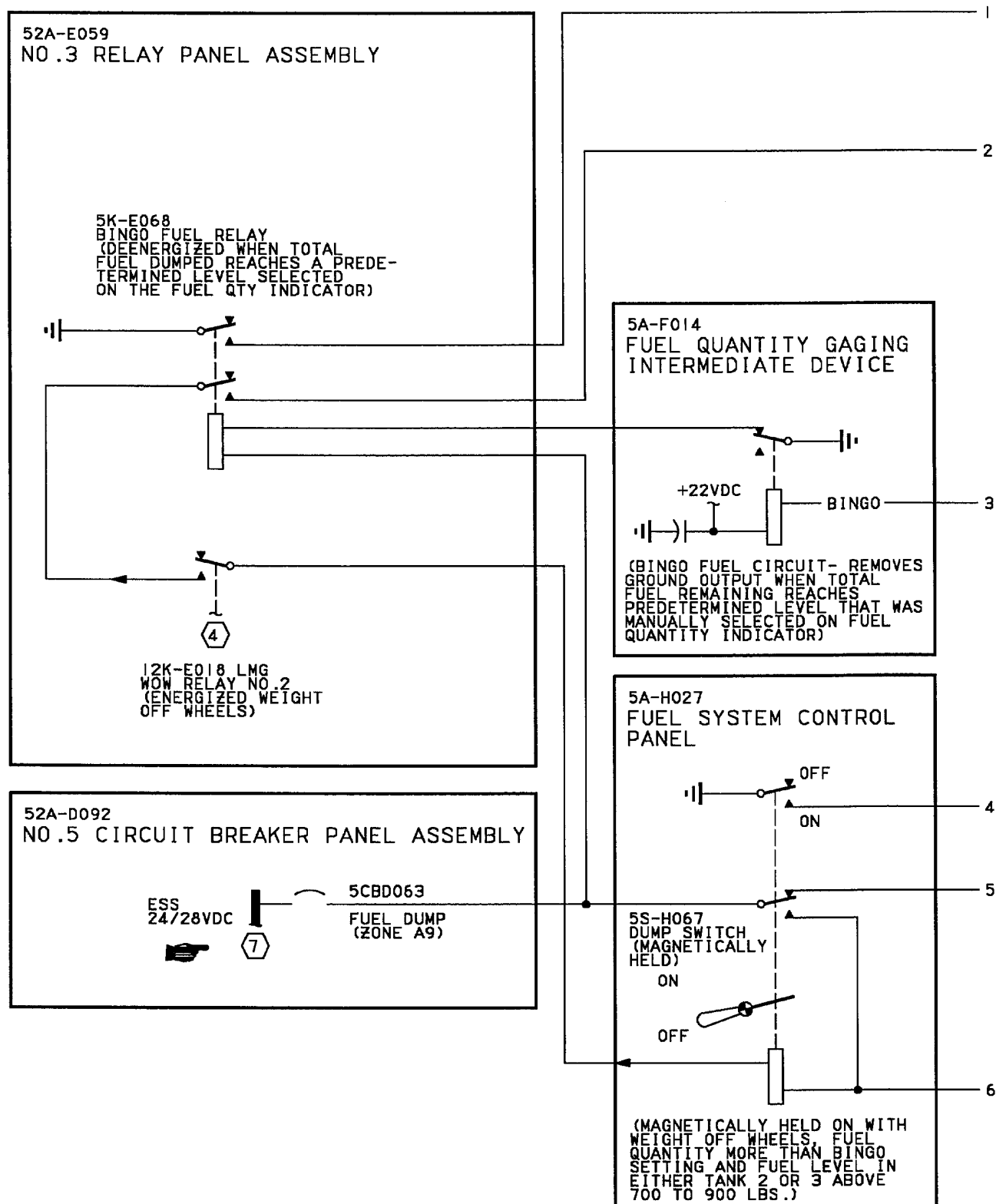
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Fuel Dump System Simplified Schematic - 161353 THRU 161761 BEFORE F/A-18 AFC 53, Figure 1 .....	2
Fuel Dump System Simplified Schematic - 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 53, Figure 2 .....	7

**Record of Applicable Technical Directives**

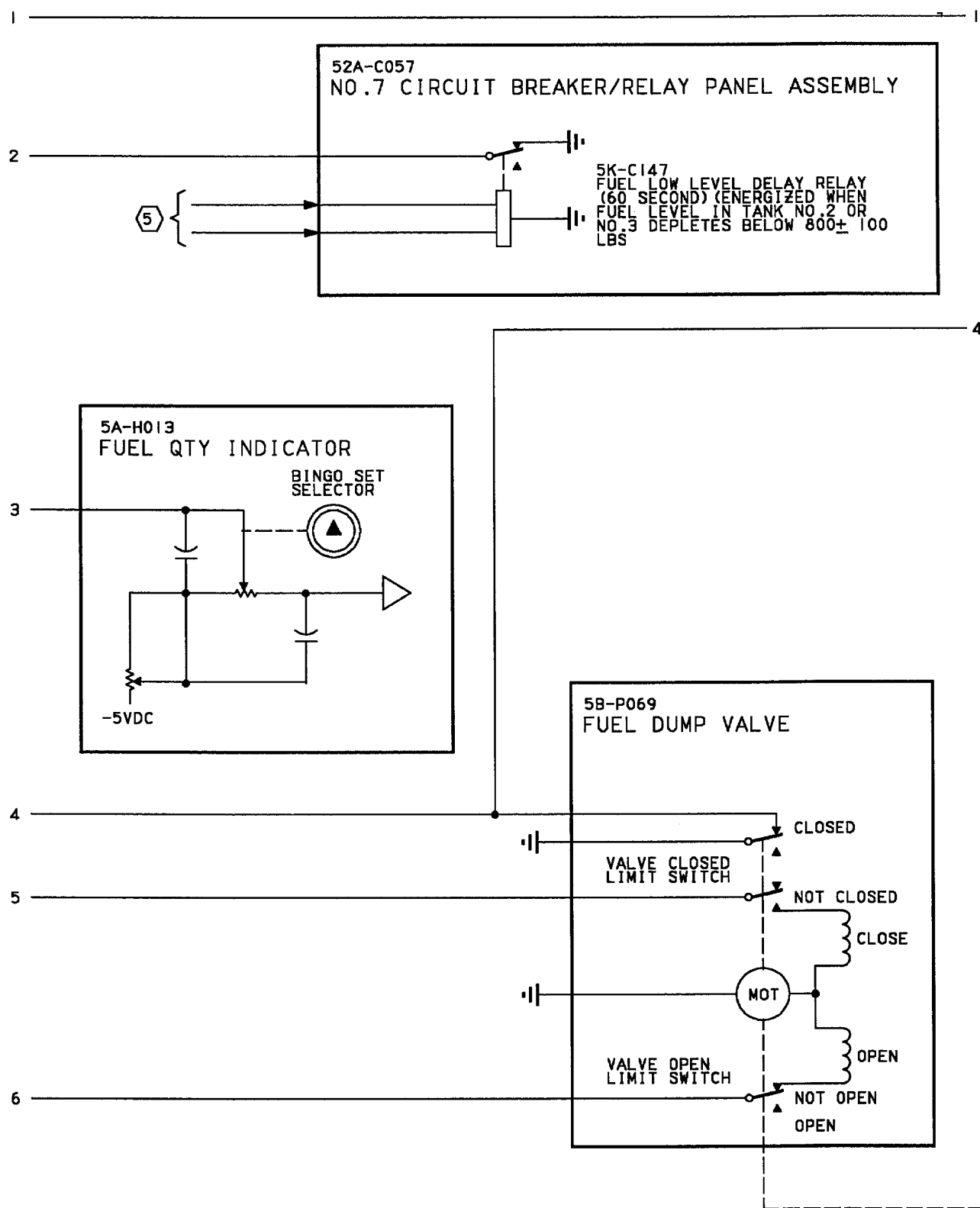
<b>Type/ Number</b>	<b>Date</b>	<b>Title and ECP No.</b>	<b>Date Incorp.</b>	<b>Remarks</b>
F/A-18 AFC 53	-	Elimination of Tanks 1 and 4 Sneak Circuit, Tank 4 Motive Flow Shutoff Valve, and Raised Inverted Baffle (ECP-MDA-F/A-18-00055/C1)	15 Jun 86	-



18AC-460-10-(20-1)22-GRID

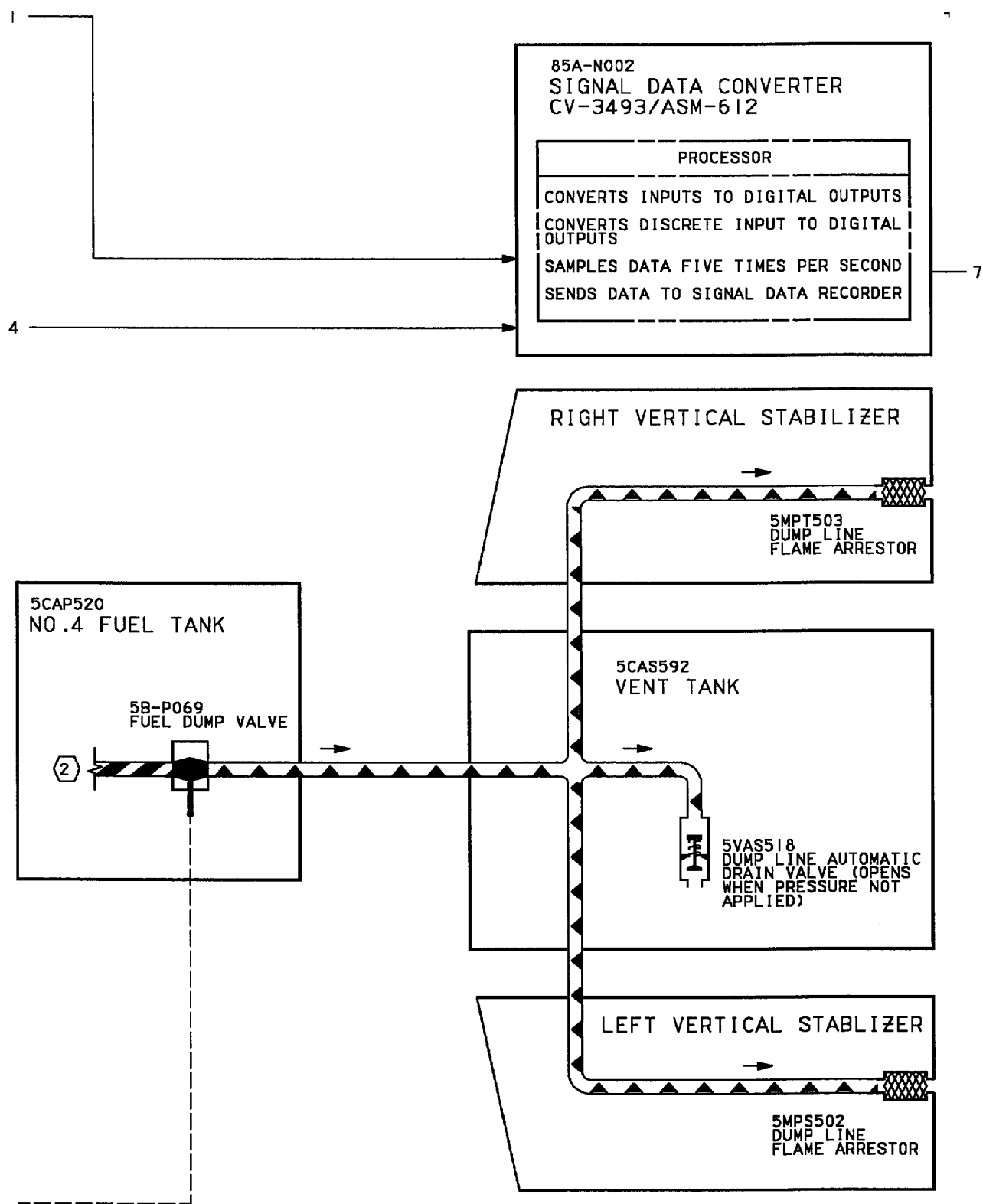
**Figure 1. Fuel Dump System Simplified Schematic - 161353 THRU 161761 BEFORE  
F/A-18 AFC 53 (Sheet 1)**





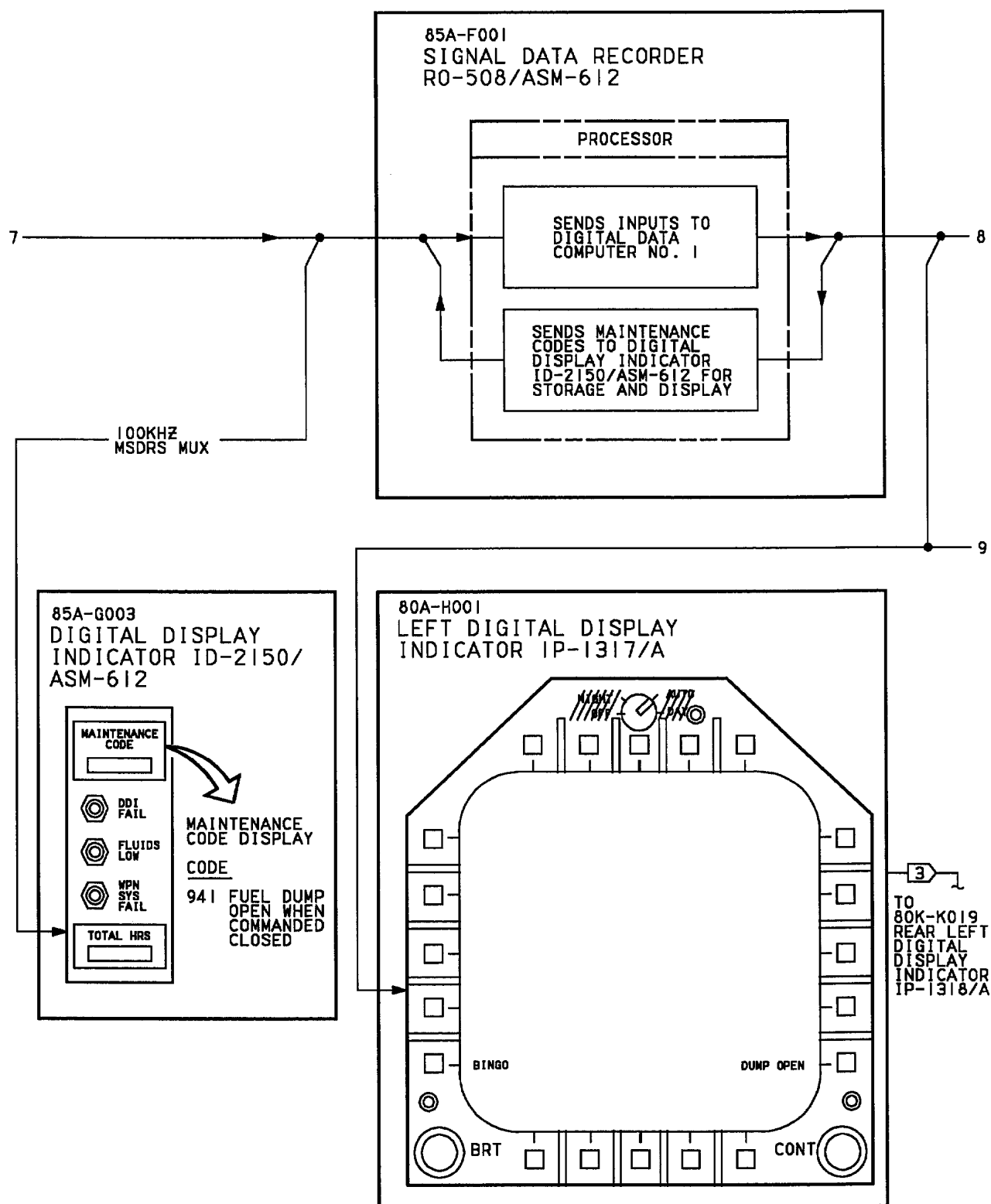
18AC-460-10-(20-2)B-GRID

Figure 1. Fuel Dump System Simplified Schematic - 161353 THRU 161761 BEFORE  
F/A-18 AFC 53 (Sheet 2)



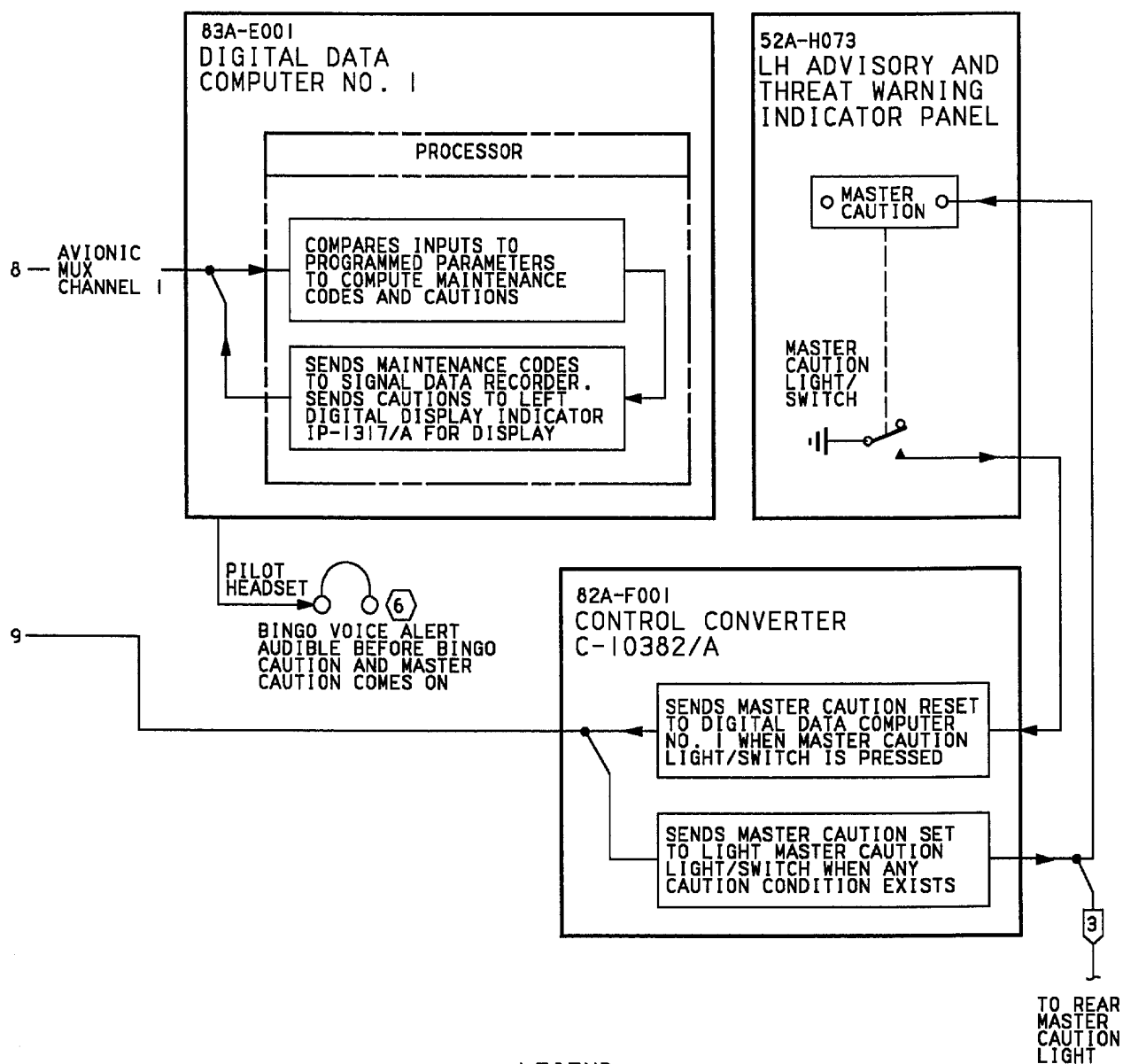
18AC-460-10-(20-3)B-GRID

**Figure 1. Fuel Dump System Simplified Schematic - 161353 THRU 161761 BEFORE  
F/A-18 AFC 53 (Sheet 3)**



18AC-460-10-(20-4)D-GRID

Figure 1. Fuel Dump System Simplified Schematic - 161353 THRU 161761 BEFORE F/A-18 AFC 53 (Sheet 4)



## LEGEND

▲▲ FUEL DUMP

▨ TRANSFER

1. NONSTANDARD SYMBOL.

○ TELELIGHT

② INTERNAL FUEL TRANSFER SYSTEM  
SIMPLIFIED SCHEMATIC, WP014 00.

③ F/A-18B.

④ LANDING GEAR CONTROLLED RELAYS SIMPLIFIED  
SCHEMATIC, A1-F18AC-130-100, WP006 00.

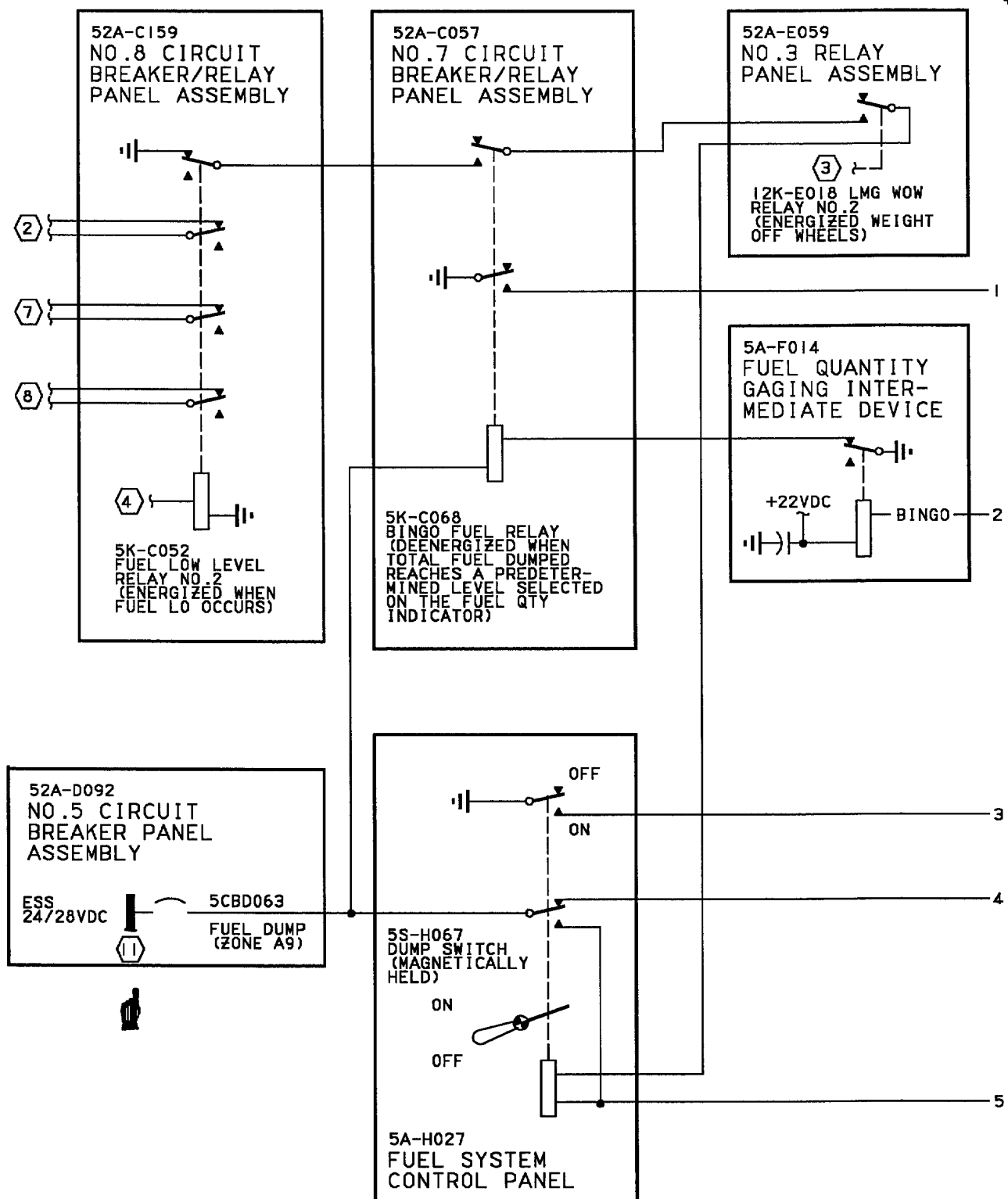
⑤ FUEL QUANTITY LOW LEVEL WARNING  
SYSTEM SIMPLIFIED SCHEMATIC, WP023 02.

⑥ INTERCOMMUNICATION AND AUDIO SYSTEM  
SIMPLIFIED SCHEMATIC, A1-F18AC-600-100,  
WP016 00.

⑦ POWER DISTRIBUTION SIMPLIFIED  
SCHEMATIC, A1-F18AC-420-100, WP005 00.

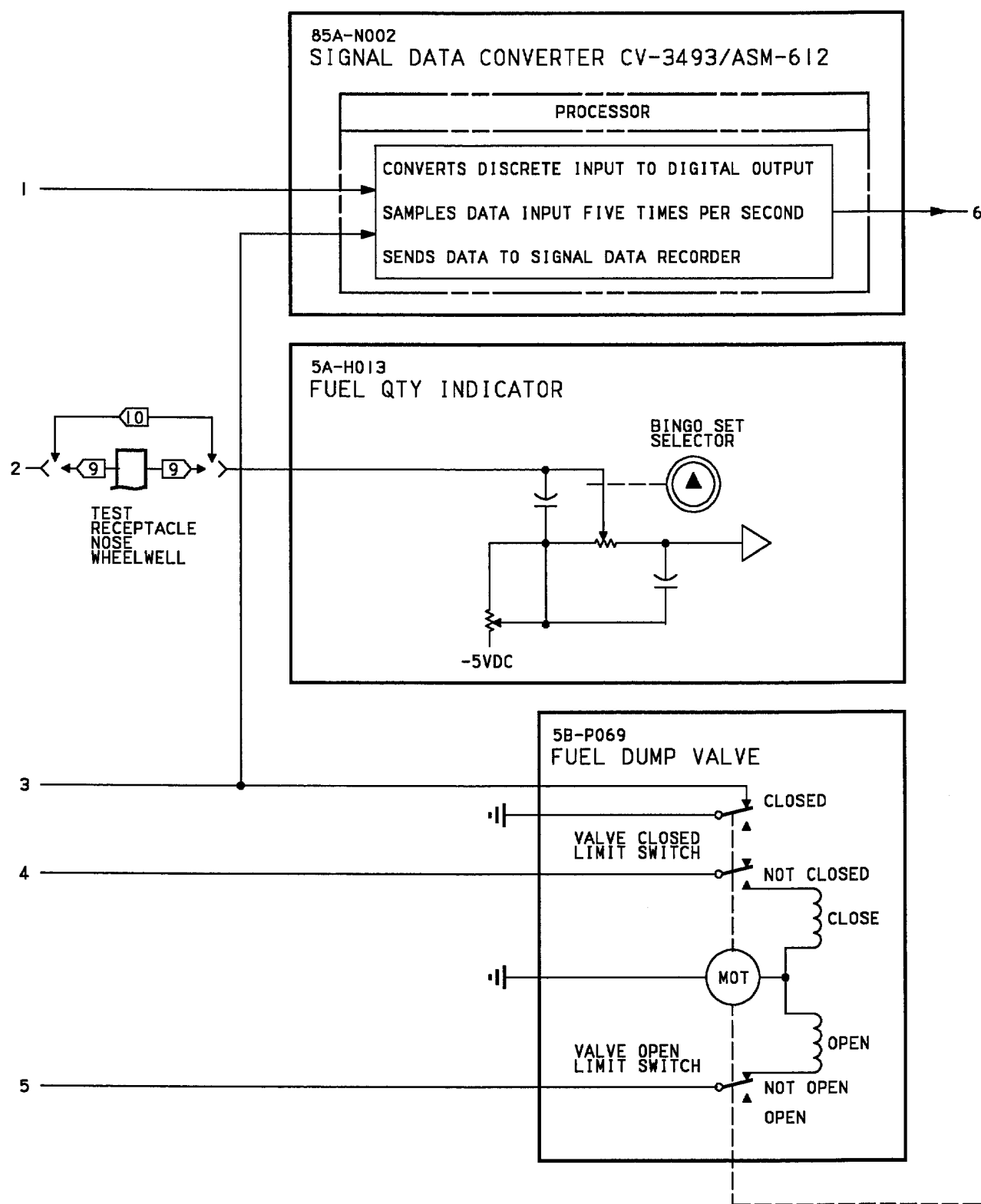
18AC-460-10-(20-5)22-GRID

Figure 1. Fuel Dump System Simplified Schematic - 161353 THRU 161761 BEFORE  
F/A-18 AFC 53 (Sheet 5)



18AC-460-10-(38-1)22-GRID

Figure 2. Fuel Dump System Simplified Schematic - 161924 AND UP; ALSO 161353 THRU 161761 BEFORE F/A-18 AFC 53 (Sheet 1)

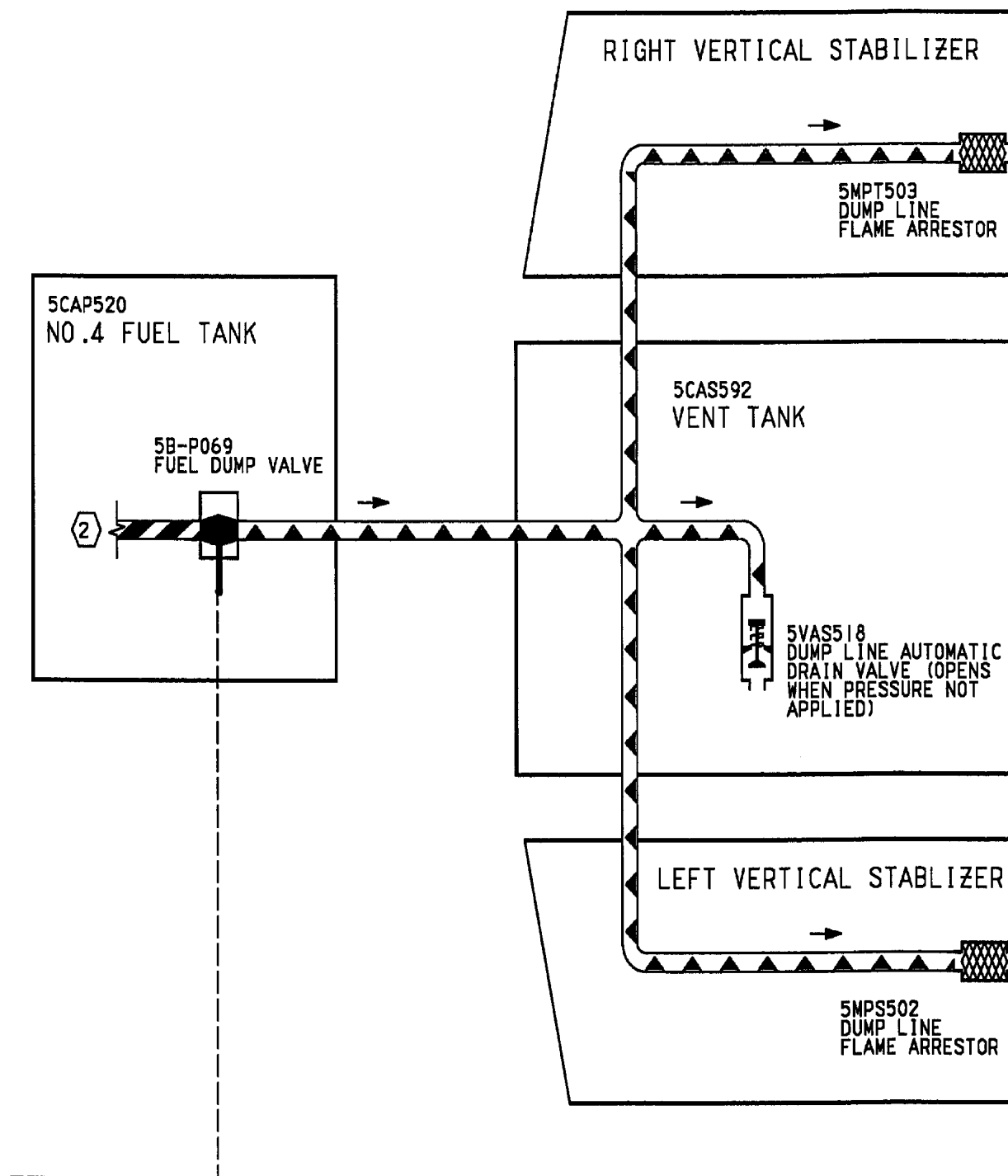


18AC-460-10-(38-2)C-GRID

**Figure 2. Fuel Dump System Simplified Schematic - 161924 AND UP; ALSO 161353 THRU 161761 BEFORE F/A-18 AFC 53 (Sheet 2)**

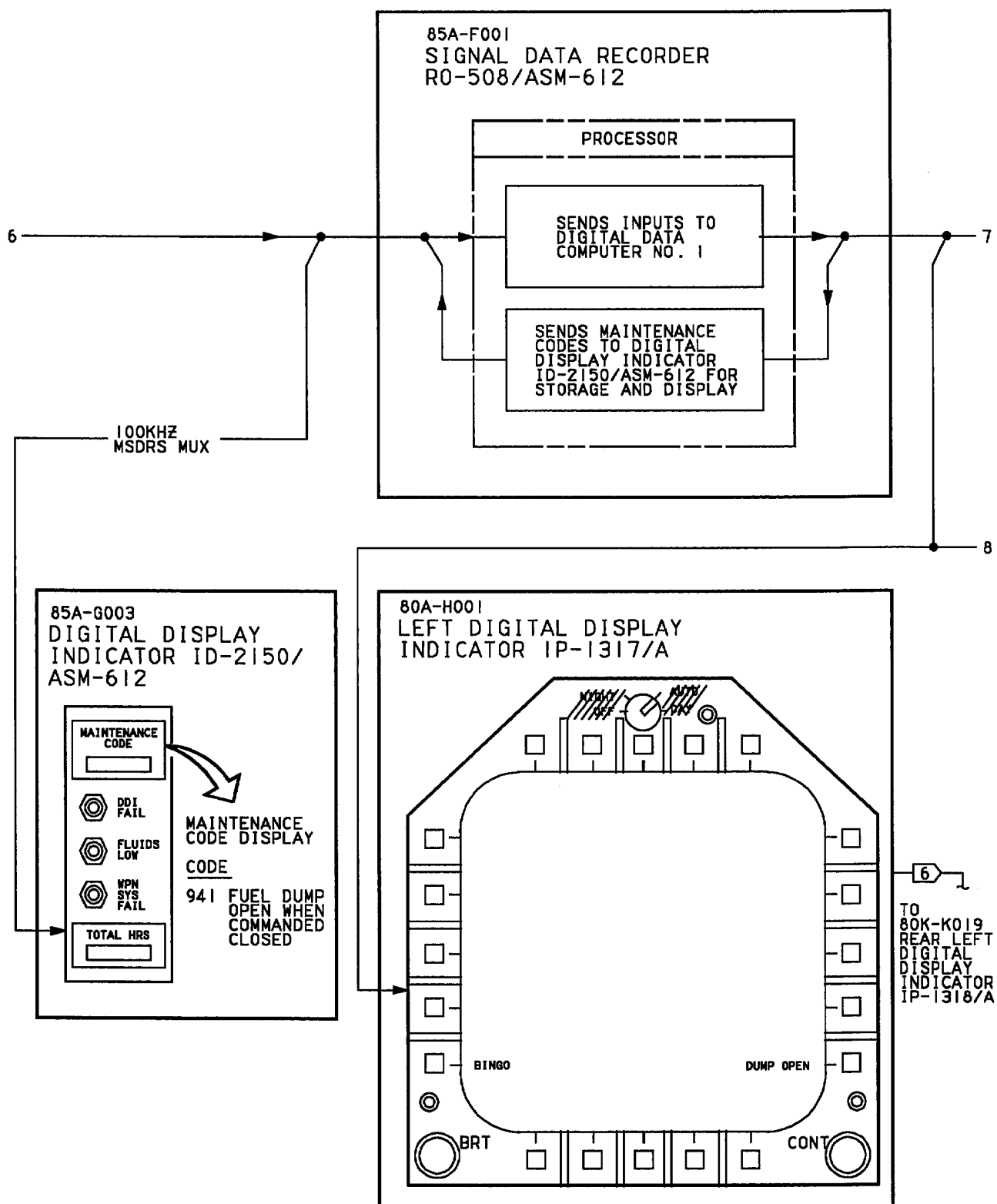
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6



18AC-460-10-(38-3)PS-GRID

Figure 2. Fuel Dump System Simplified Schematic - 161924 AND UP; ALSO 161353 THRU 161761 BEFORE F/A-18 AFC 53 (Sheet 3)



18AC-460-10-(38-4)A-GRID

Figure 2. Fuel Dump System Simplified Schematic - 161924 AND UP; ALSO 161353 THRU 161761 BEFORE F/A-18 AFC 53 (Sheet 4)



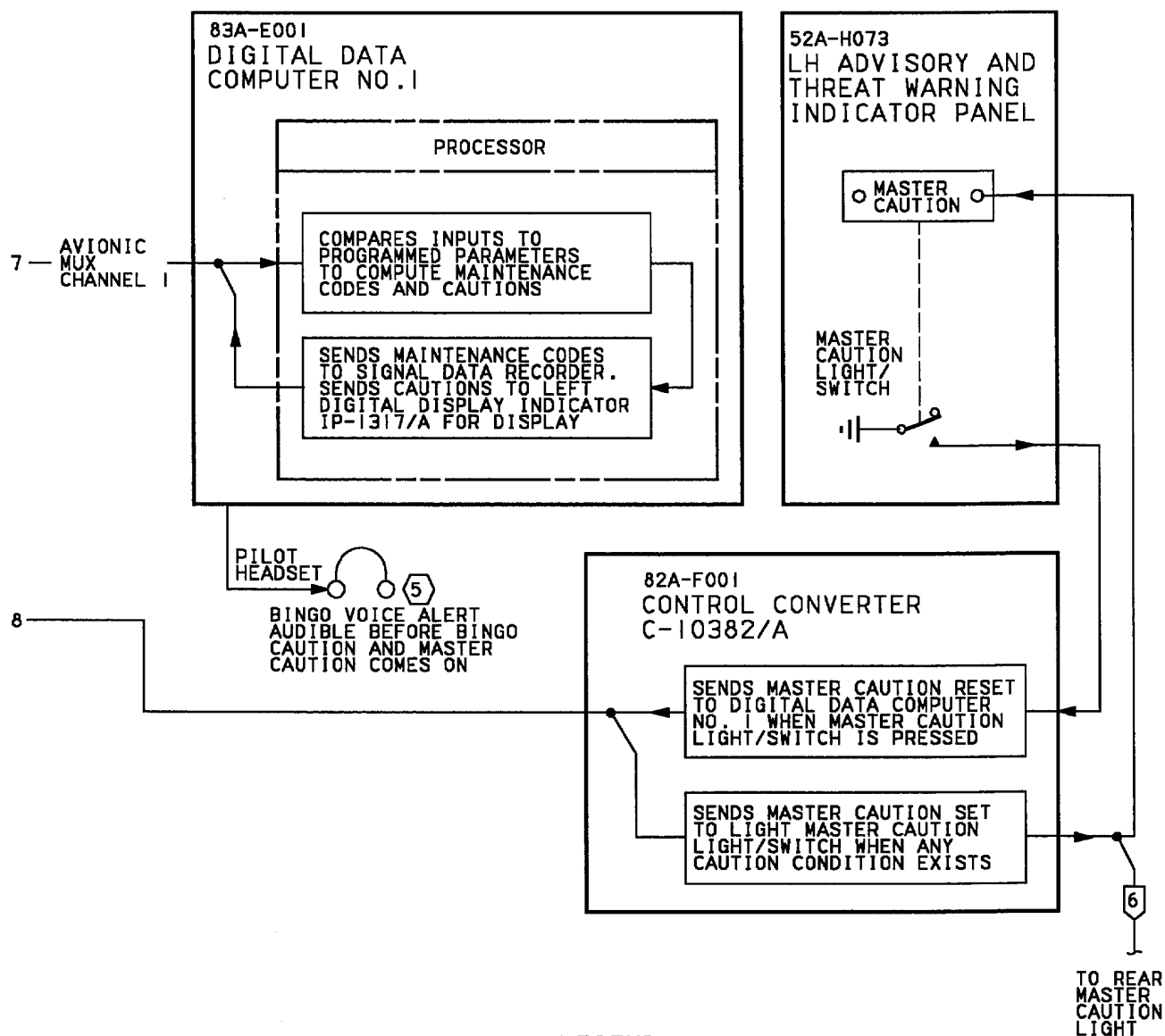


Figure 2. Fuel Dump System Simplified Schematic - 161924 AND UP; ALSO 161353  
THRU 161761 BEFORE F/A-18 AFC 53 (Sheet 5)



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**ORGANIZATIONAL MAINTENANCE**  
**PRINCIPLES OF OPERATION**  
**DESCRIPTION AND OPERATION**  
**HOT FUEL RECIRCULATION SYSTEM**

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**Reference Material**

Secondary Power System .....	A1-F18AC-240-100
AMAD System .....	WP006 00
Maintenance Status Display and Recording System .....	A1-F18AC-580-100
Operation .....	WP005 00
Hydraulic System .....	A1-F18AC-450-100
Principles of Operations .....	WP003 00
Fuel System .....	A1-F18AC-460-100
Operation .....	WP003 01
Hot Fuel Recirculation System Component Locator .....	WP018 01
Hot Fuel Recirculation System Simplified Schematic .....	WP018 02
Operation .....	WP003 01
Refuel/Defuel System Description and Operation .....	WP006 00
Internal Fuel Transfer System Description .....	WP012 00
Engine Fuel Supply System Description and Operation .....	WP015 00
Powerplant and Related Systems .....	A1-F18AC-270-100
Basic Engine System .....	WP003 00
Mission Computer System .....	A1-F18AC-741-100
Description - System and Component .....	WP003 00
Multipurpose Display Group .....	A1-F18AC-745-100
Description .....	WP003 00

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## Record of Applicable Technical Directives

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 AFC 21	-	Addition of Fuel/Air Heat Exchanger (ECP- MDA-F/A-18-00033)	15 Jun 86	-

1. **DESCRIPTION.**

2. **SYSTEM DESCRIPTION.** The hot fuel recirculation system provides cooling for fuel used to dissipate heat from the AMAD gearbox oil and hydraulic system oil. The system uses motive flow pressure to provide fuel flow through heat exchangers and to the wings.

3. Normally, hot fuel is dispersed into the wings, cooled by convection and then transferred to tanks 1 and/or 4. If wing damage occurs, fuel can be diverted to the feed tanks to prevent loss of fuel. To provide all available fuel for engine feed, all hot fuel is routed to tanks 2 and 3 if aircraft reaches fuel low level warning (feed tanks at 800  $\pm$ 100 pounds each).

4. On 161520 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 21, hot fuel is routed through a fuel/air heat exchanger for cooling before entering the wing.

5. **COMPONENT DESCRIPTION.** Hot fuel recirculation system components shown in WP018 01 and WP018 02 are described in paragraphs below. For related component descriptions listed below, see references listed.

- a. Vent tank scavenge jet ejector (WP012 00)
- b. Engine motive flow check valves (WP012 00).
- c. Hydraulic oil/fuel heat exchanger (A1-F18AC-450-100, WP003 00).
- d. AMAD fuel/oil heat exchanger (A1-F18AC-240-100, WP006 00).
- e. Motive flow/boost pump (WP012 00).
- f. AMAD (A1-F18AC-240-100, WP006 00).
- g. Engine fuel coupling check valve (WP015 00).

6. **Fuel Diverter Valves.** The fuel diverter valve is a 28vdc solenoid operated valve. The diverter valve is normally energized to route hot fuel to the wings for cooling. When deenergized, fuel flows directly to the feed tanks (WP003 01).

7. **Fuel/Air Heat Exchangers - 161520 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 21.**

The fuel/air heat exchangers are located outboard of the fuselage skin in the left and right AIM-7 missile fairing. Ram air passes over the fuel/air heat exchanger and cools circulating fuel.

8. **Heat Exchangers Wash Filters.** The heat exchangers wash filters trap foreign material and prevent it from flowing through the heat exchangers.

9. **Fuel Feedline Temperature Sensors.** The fuel feedline temperature sensors are hermetically sealed thermocouple probes located in the left and right engine feed lines. The sensors provide engine feed line temperature readings to the MSDRS for processing.

10. **Hot Fuel Recirculation Check Valve.** The hot fuel recirculation check valve is located in tank 4. The check valve prevents gravity fuel flow to the motive flow/boost pump (WP012 00) when the pump is not operating.

11. **Fuel/Oil Heat Exchanger Check Valve.** The fuel/oil heat exchanger check valve is a one way check valve located on the left and right crossfeed manifolds. The check valve prevents fuel flow from the crossfeed manifold through the hot fuel recirculation system.

12. **RELATED SYSTEMS.** Systems related to the hot fuel recirculation system are listed below.

13. **Maintenance Status Display and Recording System (MSDRS).** The maintenance status display and recording system receives inputs from the fuel system through the signal data converter and recorder. The MSDRS signal data recorder sends

data to the mission computer system for processing. If the mission computer system detects a fuel system

failure, it sends the applicable maintenance code to the MSDRS signal data recorder which sends it to the nose wheelwell Digital Display Indicator ID-2150/ASM-612 for storage and display (A1-F18AC-580-100, WP005 00).

**14. Mission Computer System.** The mission computer system receives fuel system data from the MSDRS. The mission computer system digital data computer no. 1 processes the data to determine when a fuel system failure or caution condition occurs. If a failure occurs, digital data computer no. 1 sends the applicable maintenance code to the MSDRS for storage and display. If a caution condition occurs, digital data computer no. 1 sends the caution message to the multipurpose display group for display (A1-F18AC-741-100, WP003 00).

**15. Multipurpose Display Group.** If the mission computer system detects a fuel system caution condition, it sends the caution message to the multipurpose display group. The left Digital Display Indicator IP-1317( ) and on F/A-18B, the rear left Digital Display Indicator IP-1318( ) receive and display the caution messages (A1-F18AC-745-100, WP003 00).

**16. Secondary Power Supply.** The fuel system motive flow/boost pumps are mounted on the airframe mounted accessory drive (AMAD) units (A1-F18AC-270-100, WP003 00). During normal operation, the engine powers AMAD accessories.

**17.** Fuel from the engine fuel supply is the cooling media used by the fuel/oil heat exchangers to cool AMAD gearbox oil and hydraulic oil.

**18. SYSTEM CONTROLS AND INDICATORS.** System controls and indicators in the hot fuel recirculation system are listed below.

**19. MASTER CAUTION Light.** The MASTER CAUTION light is located on the LH advisory and threat warning indicator panel. This caution light is yellow and indicates a fuel system caution/advisory requiring attention but no immediate action.

**20. Digital Display Indicator IP-1317( ), IP-1318( ).** L FUEL HOT or R FUEL HOT caution display will appear on left Digital Display Indicator IP-1317( ) in the cockpit and on F/A-18B, left Digital Display Indicator IP-1318( ) in the rear cockpit if engine feed fuel temperatures exceed 79°C (175°F).

**21. Digital Display Indicator ID-2150/ASM-612.** The Digital Display Indicator ID-2150/ASM-612 in the nose wheelwell stores and displays fuel system maintenance failure codes.

**22. INTR WING Switch.** The INTR WING switch is located on the EXT LT control panel. When this switch is set to INHIBIT, the wing damage shutoff valve (WP012 00) closes stopping motive flow to each wing transfer ejector, the wing refuel lockout valve (WP005 00) is energized preventing wing refueling and the diverter valves are deenergized directing hot fuel recirculation to the feed tanks.

## 23. OPERATION.

**24. COMPONENT OPERATION.** Detailed operational description for the fuel diverter valve is given in WP003 01.

**25. SYSTEM OPERATION.** The operation of the hot fuel recirculation system is the same for the left and right AMAD gearboxes.

**26.** Aircraft fuel is used to absorb and dissipate heat produced by the AMAD gearboxes through an AMAD oil/fuel heat exchanger (A1-F18AC-240-100, WP006 00). The hydraulic system oil is cooled by the hydraulic oil/fuel heat exchanger in the hot fuel recirculation system.

**27.** Motive flow fuel from the motive flow/boost pump is routed through the AMAD oil/fuel heat exchangers to the engines. Fuel is also routed through the hydraulic oil/fuel heat exchangers and on 161520 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 21, the fuel/air heat exchangers. Fuel that flows through the oil/fuel and fuel/air heat exchangers is routed through the diverter valves to the wing or feed tanks.

**28.** The normally energized diverter valves route fuel to the wing tanks when motive flow pressure is applied. When the diverter valve is deenergized, fuel is routed to the feed tanks. The diverter valves are deenergized when the INTR WING switch is set to INHIBIT or fuel amounts in tank 2 or 3 is below 800 ±100 pounds (fuel low level warning).

**29.** Fuel feedline temperature sensors monitor engine feed fuel temperature. If temperature exceeds 79°C (175°F), a L/R FUEL HOT caution is

displayed on left cockpit DDI. If temperature sensors exceed a range from  $-60^{\circ}\text{C}$  to  $100^{\circ}\text{C}$  ( $-76^{\circ}\text{F}$  to  $212^{\circ}\text{F}$ ) for 5 seconds or more, a code 658 or 674 (L/R fuel temperature signal fail) is sent to nose wheelwell DDI for storage and display.

30. Selecting MENU on the left DDI then pressing the button next to ENG, displays the engine condition monitoring system (ECMS) format. True engine feed fuel temperature ( $^{\circ}\text{C}$ ) for each engine is included in this display.

**31. Hot Fuel Recirculation System Cautions/Codes.** Cautions are displayed on left cockpit DDI

IP-1317( ), IP-1318( ) and light the MASTER CAUTION light. Codes are displayed on nose wheelwell DDI ID-2150/ASM-612. Hot fuel recirculation system cautions/codes are explained below.

32. L/R FUEL HOT. Caution that indicates the temperature of the fuel being supplied to the engine exceeds  $79^{\circ}\text{C}$  ( $175^{\circ}\text{F}$ ).

33. Code 658. Code that indicates left fuel temperature sensor signal has failed.

34. Code 674. Code that indicates right fuel temperature sensor signal has failed.

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**ORGANIZATIONAL MAINTENANCE**  
**PRINCIPLES OF OPERATION**  
**COMPONENT LOCATOR**  
**HOT FUEL RECIRCULATION SYSTEM**

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**Reference Material**

None

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**Record of Applicable Technical Directives**

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 AFC 21	-	Addition of Fuel/Air Heat Exchanger (ECP- MDA-F/A-18-00033)	15 Jun 86	-
F/A-18 AFC 18	-	Incorporation of Fuel Turbine Boost Pump/ Sealing of Raised Baffle in Fuel Tanks 2 and 3 (ECP-MDA-F/A-18-00077C1/C2)	1 Nov 86	-

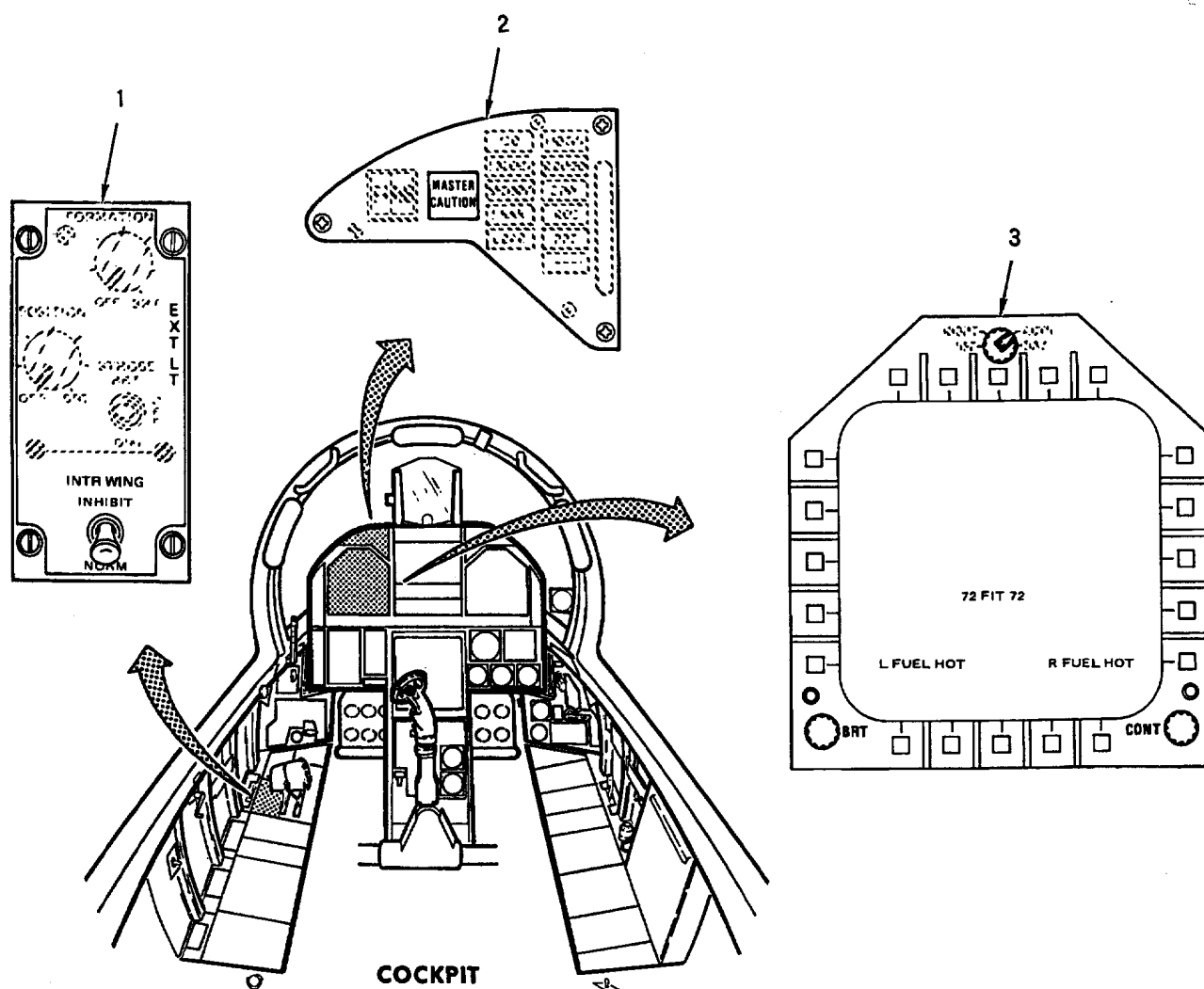
NOMENCLATURE	INDEX NO.	REF DES
AMAD FUEL/OIL HEAT EXCHANGER LEFT RIGHT	10	3HPS531 3HPT532
CONTROL CONVERTER C-10382/A	5	82A-F001
CROSSFEED MANIFOLD	11	
DIGITAL DATA COMPUTER NO. 1	6	83A-E001
DIGITAL DISPLAY INDICATOR ID-2150/ASM-612	14	85A-G003
ENGINE FUEL COUPLING CHECK VALVE LEFT RIGHT	12	5VAP639 5VAR640
EXT LT CONTROL PANEL ASSEMBLY INTR WING SWITCH	1	52A-H091 5S-H026
FUEL CROSSFEED SHUTOFF VALVE	15	5B-P071
FUEL DIVERTER VALVE LEFT RIGHT	22	5L-P119 5L-R118
FUEL FEED LINE TEMPERATURE SENSOR LEFT RIGHT	18	5A-P111 5A-R112
1 FUEL/AIR HEAT EXCHANGER LEFT RIGHT	13	5MPP670 5MPR671
FUEL/OIL HEAT EXCHANGER CHECK VALVE LEFT RIGHT	19	5VAS523 5VAT524
HEAT EXCHANGERS WASH FILTER (INTEGRAL PART OF TUBE) LEFT RIGHT	21	5FAP647 5FAR648
HOT FUEL RECIRCULATION CHECK VALVE LEFT RIGHT	23	5VAP585 5VAR584
HOT FUEL RECIRCULATION RESTRICTOR (INTEGRAL PART OF TUBE) LEFT RIGHT	20	5RAP655 5RAR656
2 HOT FUEL RECIRCULATION WING RESTRICTOR LEFT RIGHT	9	5RAP657 5RAR658
HYDRAULIC OIL/FUEL HEAT EXCHANGER LEFT RIGHT	16	10HPP518 10HPR519

MCS+  
18AC-460-10-(31-1)G

Figure 1. Hot Fuel Recirculation System Component Locator (Sheet 1)

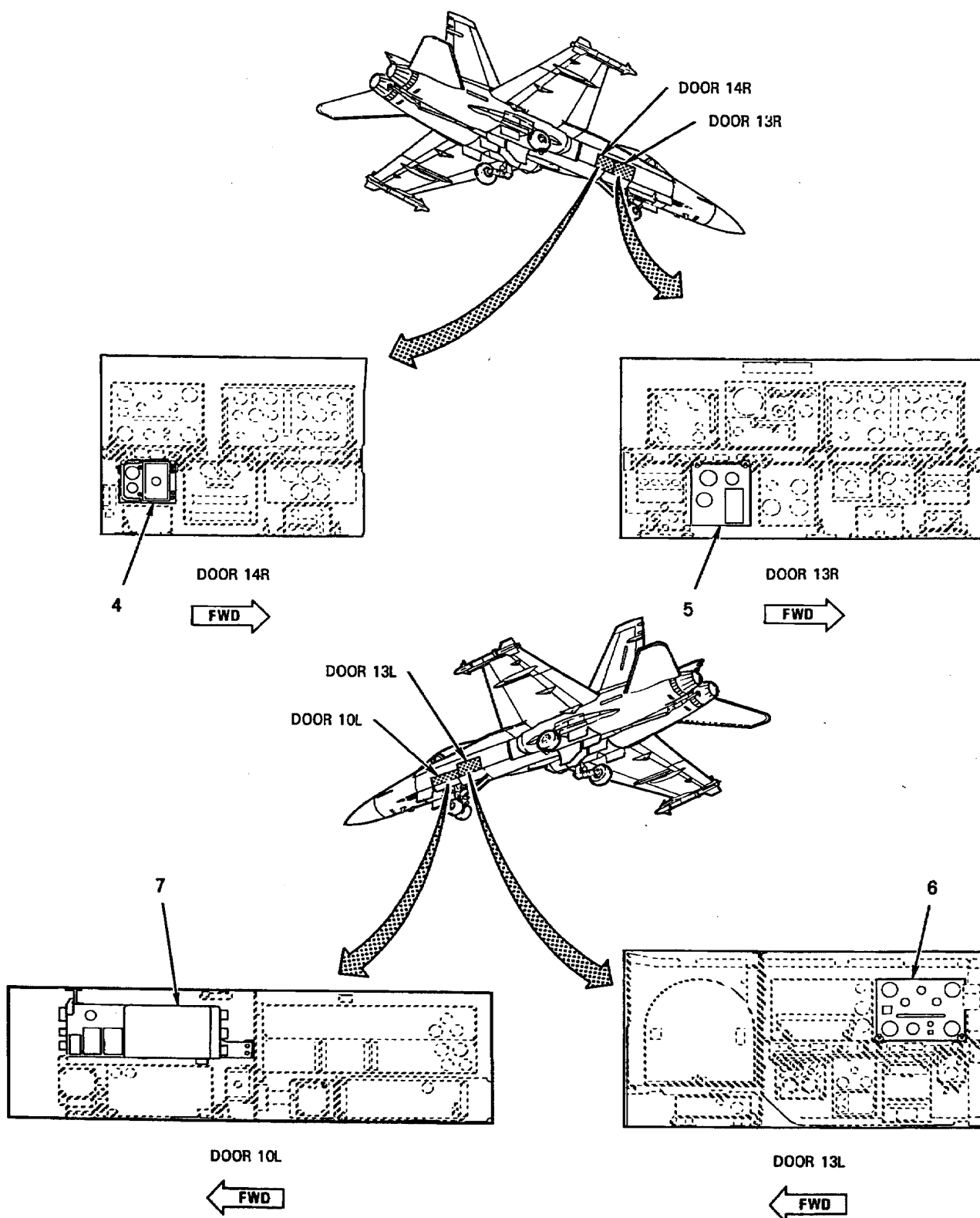


NOMENCLATURE	INDEX NO.	REF DES
LEFT DIGITAL DISPLAY INDICATOR IP-1317( )	3	80A-H001
LH ADVISORY AND THREAT WARNING INDICATOR PANEL	2	52A-H073
MOTIVE FLOW BOOST PUMP LEFT RIGHT	17	5BAS515 5BAT514
NO. 8 CIRCUIT BREAKER/RELAY PANEL ASSEMBLY FUEL LOW LEVEL RELAY NO. 2 WING FUEL (ZONE A7)	7	52A-C159 5K-C052 5CBC115
SIGNAL DATA CONVERTER CV-3493/ASM-612	8	85A-N002
SIGNAL DATA RECORDER RO-508/ASM-612	4	85A-F001
VENT SCAVENGE JET EJECTOR LEFT RIGHT	24	5BAP559 5BAR560



18AC-460-10-(31-2)G

Figure 1. Hot Fuel Recirculation System Component Locator (Sheet 2)



18AC-460-10-(31-3)D

Figure 1. Hot Fuel Recirculation System Component Locator (Sheet 3)

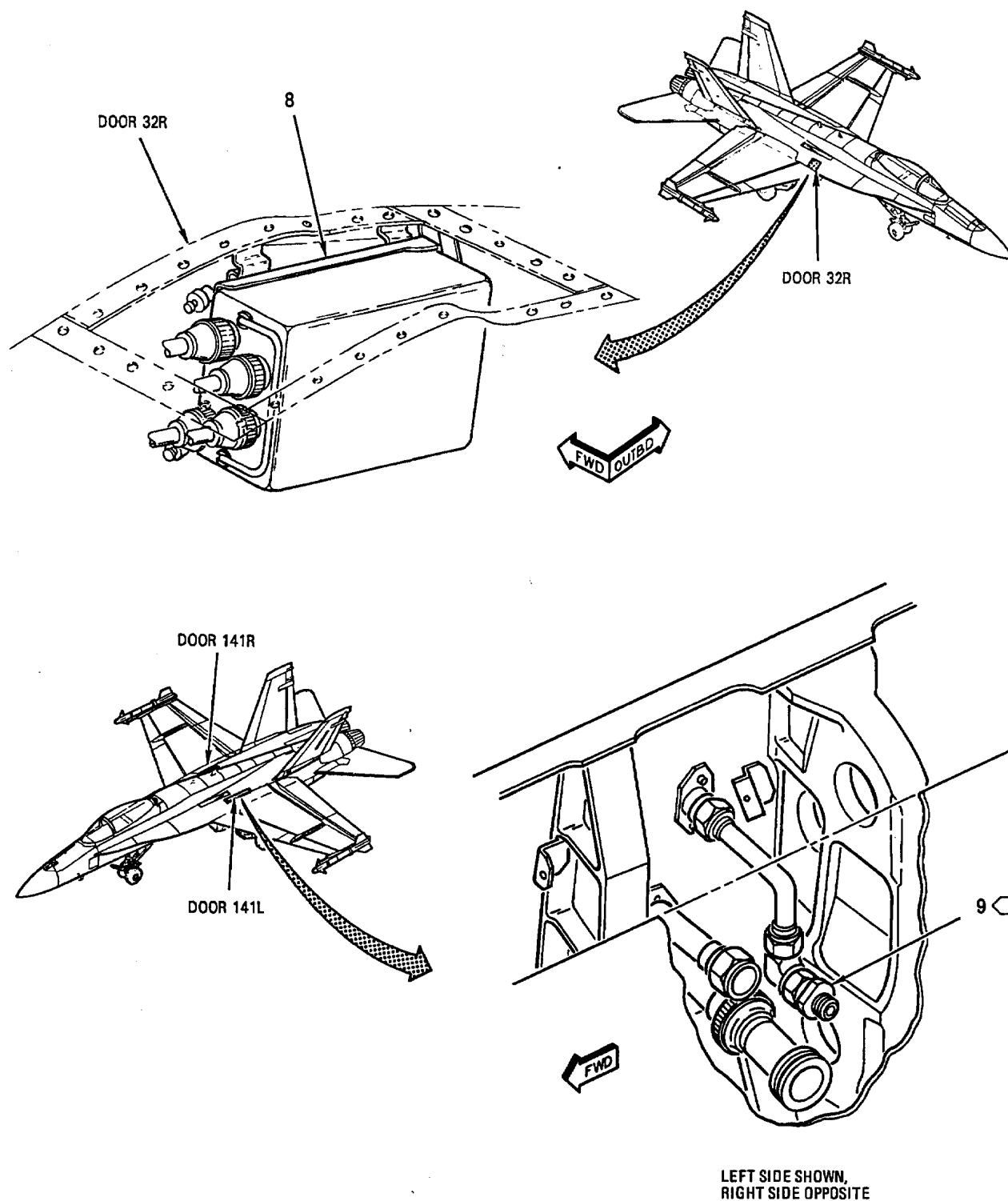


Figure 1. Hot Fuel Recirculation System Component Locator (Sheet 4)

18AC-460-10-(31-4)D

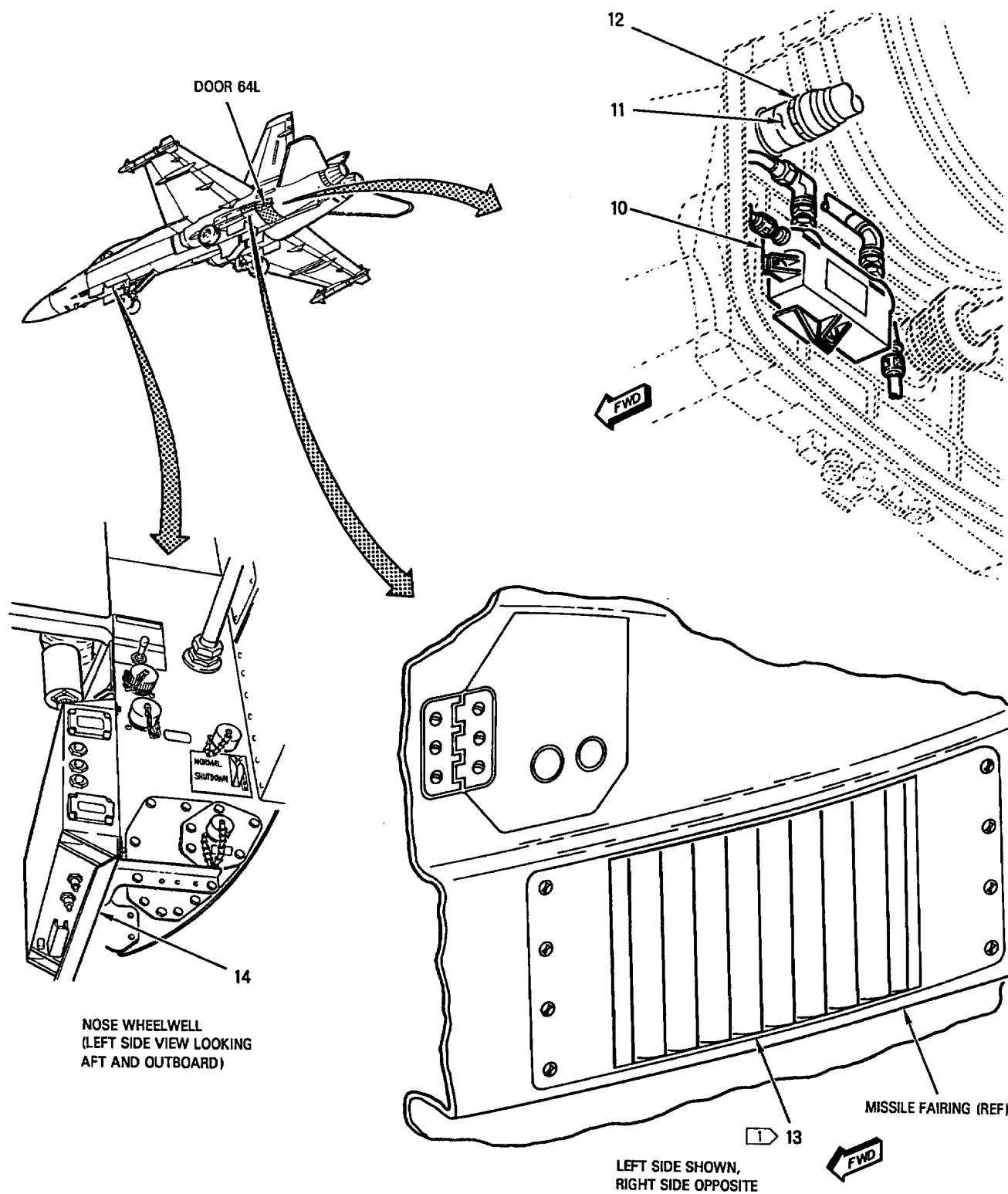
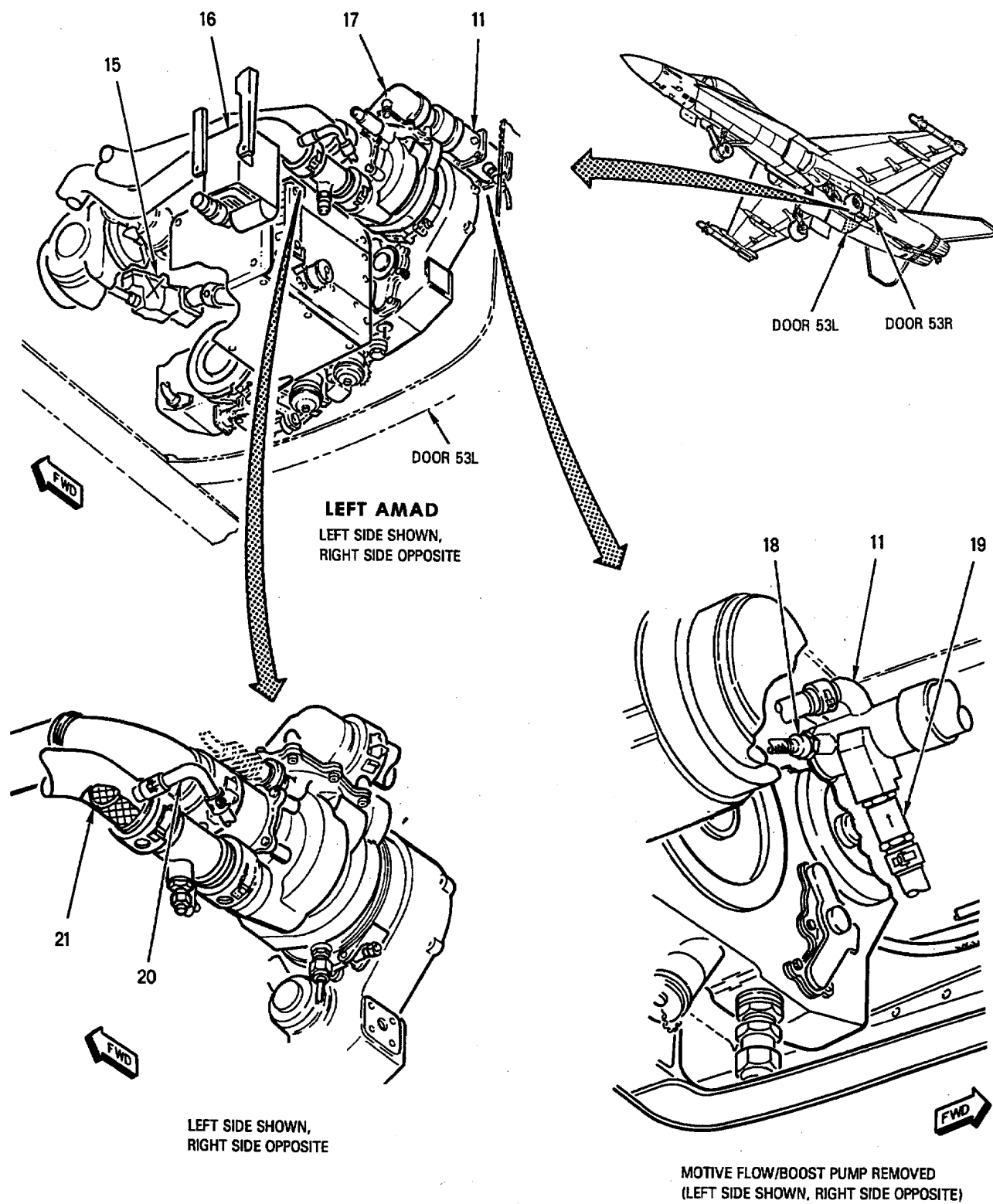


Figure 1. Hot Fuel Recirculation System Component Locator (Sheet 5)



18AC-460-10-(31-6)D

Figure 1. Hot Fuel Recirculation System Component Locator (Sheet 6)

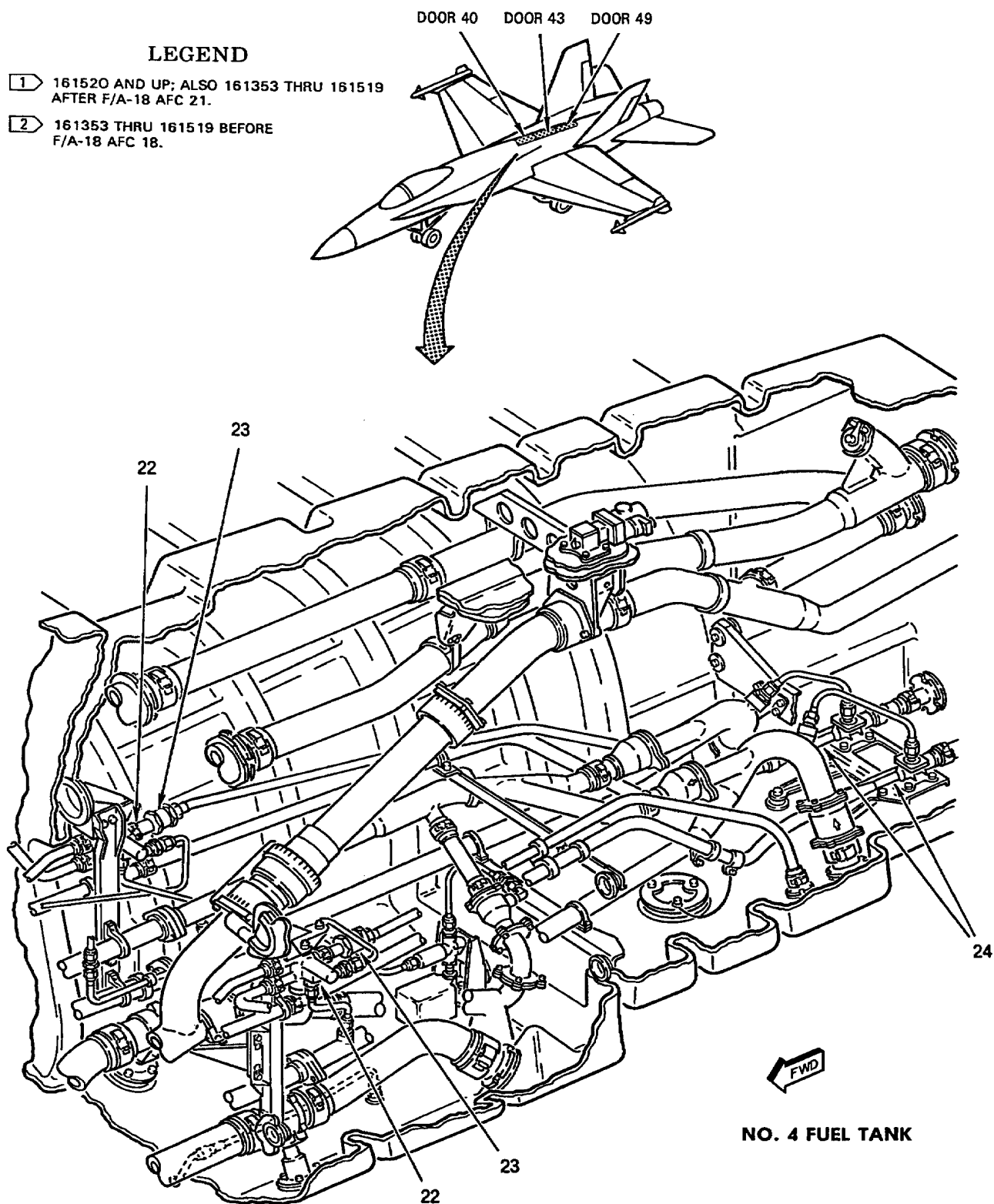


Figure 1. Hot Fuel Recirculation System Component Locator (Sheet 7)

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**ORGANIZATIONAL MAINTENANCE**  
**PRINCIPLES OF OPERATION**  
**SIMPLIFIED SCHEMATIC**  
**HOT FUEL RECIRCULATION SYSTEM**

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**Reference Material**

None

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**Record of Applicable Technical Directives**

<b>Type/ Number</b>	<b>Date</b>	<b>Title and ECP No.</b>	<b>Date Incorp.</b>	<b>Remarks</b>
F/A-18 IAFC-056	27 Mar 85	Fuel System Components Replacement and System Inspection (ECP-MDA- F/A-18-00158R1 and ECP-MDA-F/A-18- 00160)	1 Jul 85	-
F/A-18 AFC 21	-	Addition of Fuel/Air Heat Exchanger (ECP- MDA-F/A-18-00033)	15 Jun 86	-
F/A-18 AFC 18	-	Incorporation of Fuel Turbine Boost Pump/ Sealing of Raised Baffle in Fuel Tanks Tanks 2 and 3 (ECP-MDA-F/A-18-00077C1/C2)	1 Nov 86	-

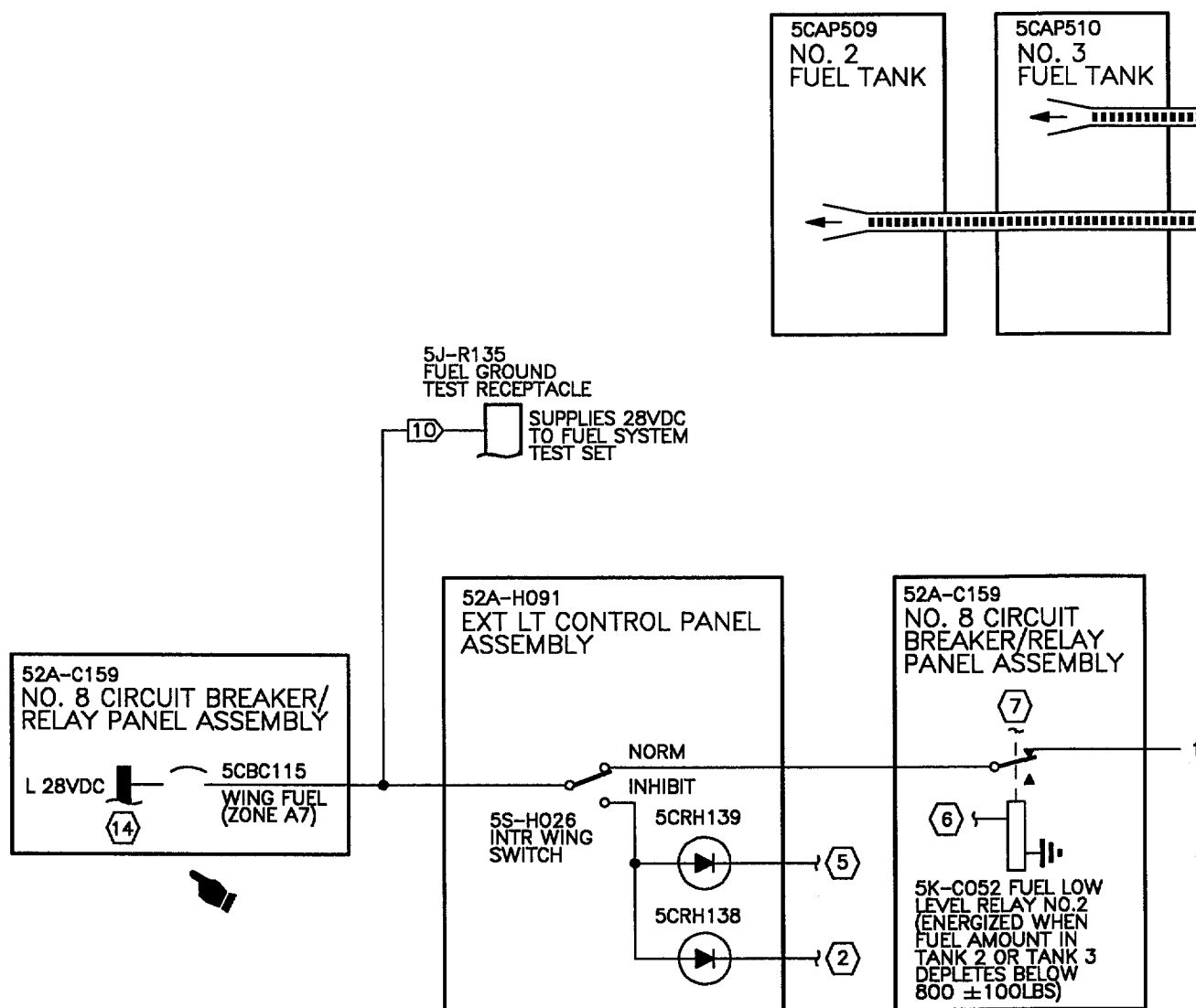
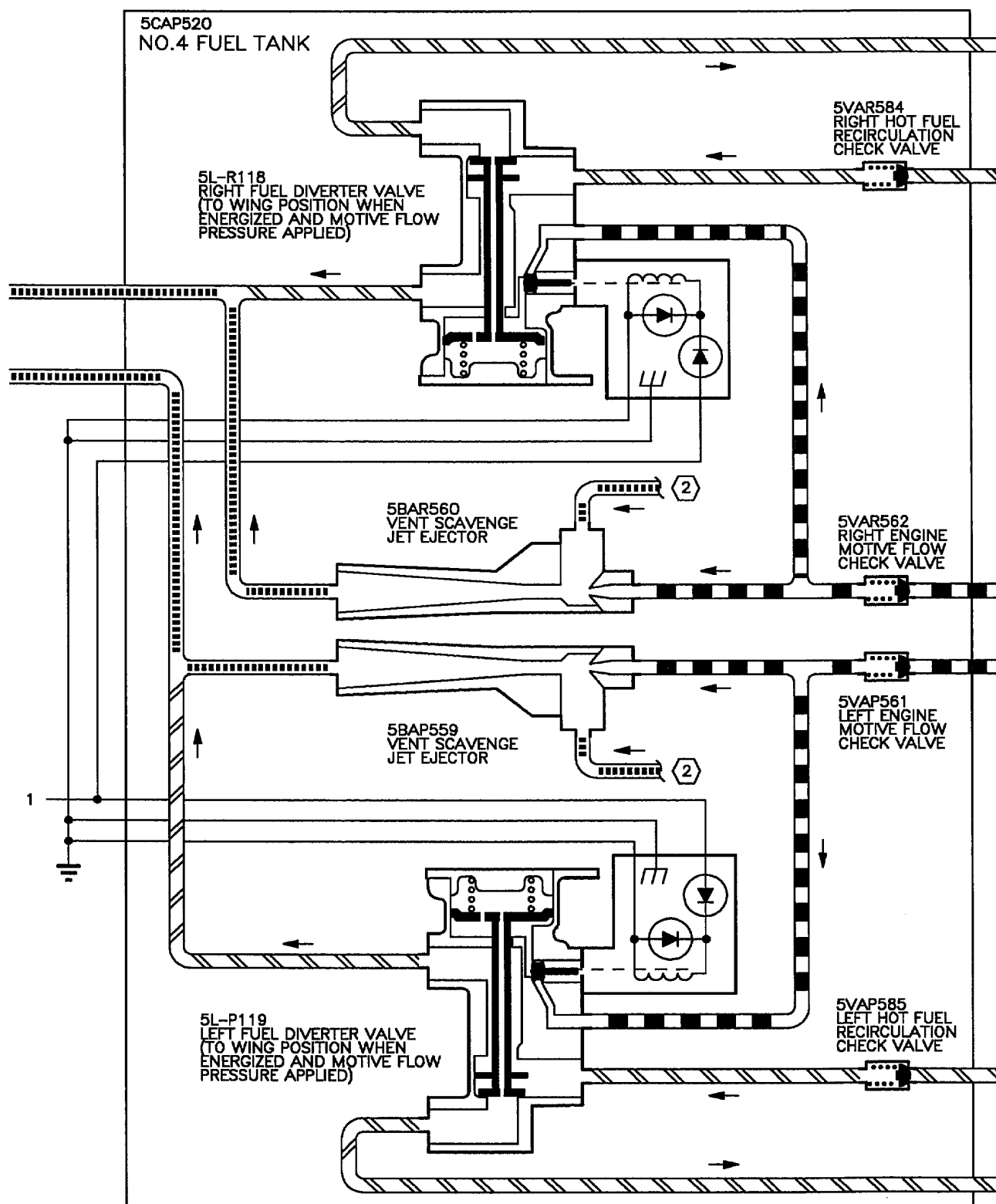


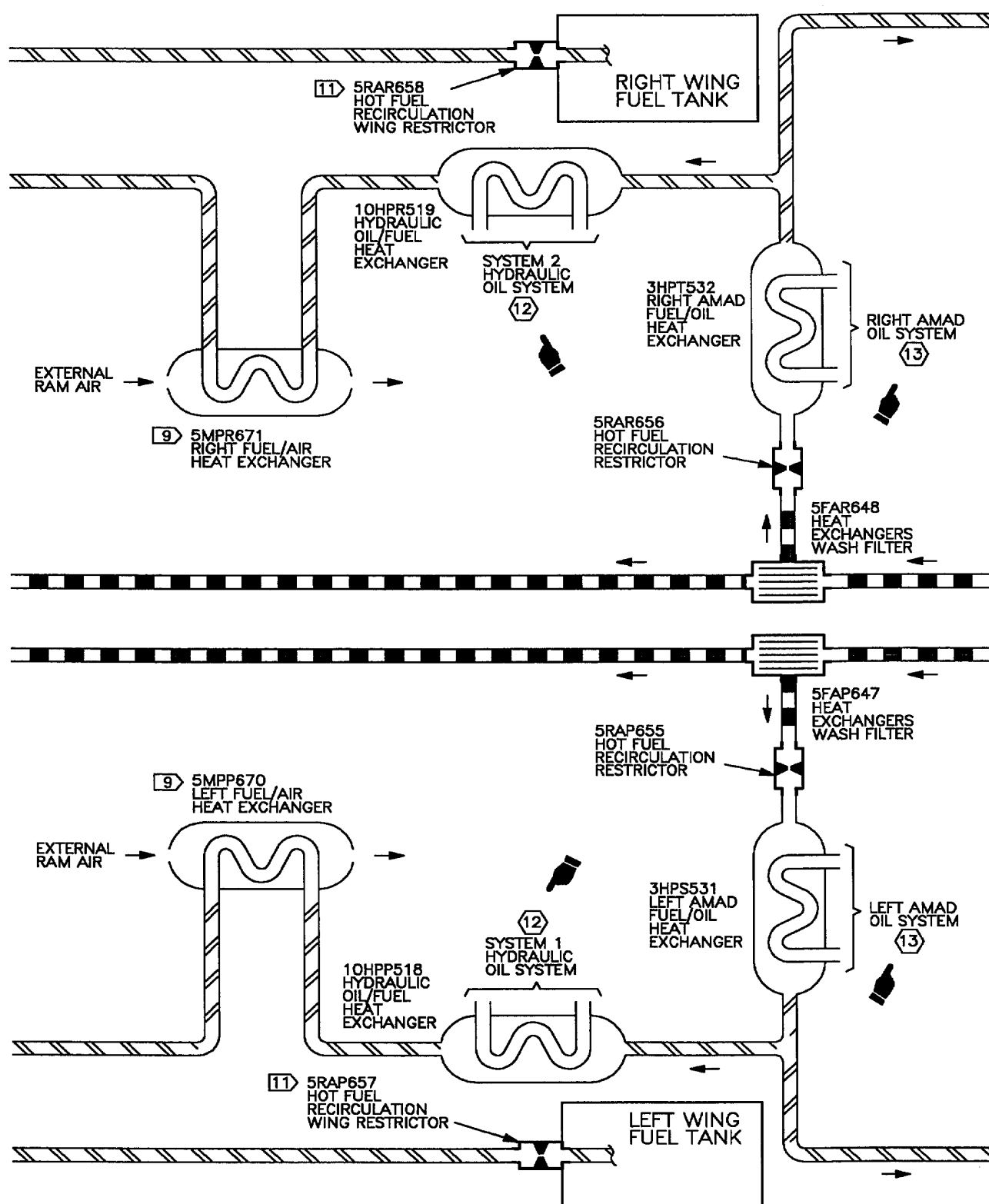
Figure 1. Hot Fuel Recirculation System Simplified Schematic (Sheet 1)





18AC-460-10-(14-2)F-CATI

Figure 1. Hot Fuel Recirculation System Simplified Schematic (Sheet 2)



18AC-460-10-(14-3)22-CAT1

Figure 1. Hot Fuel Recirculation System Simplified Schematic (Sheet 3)

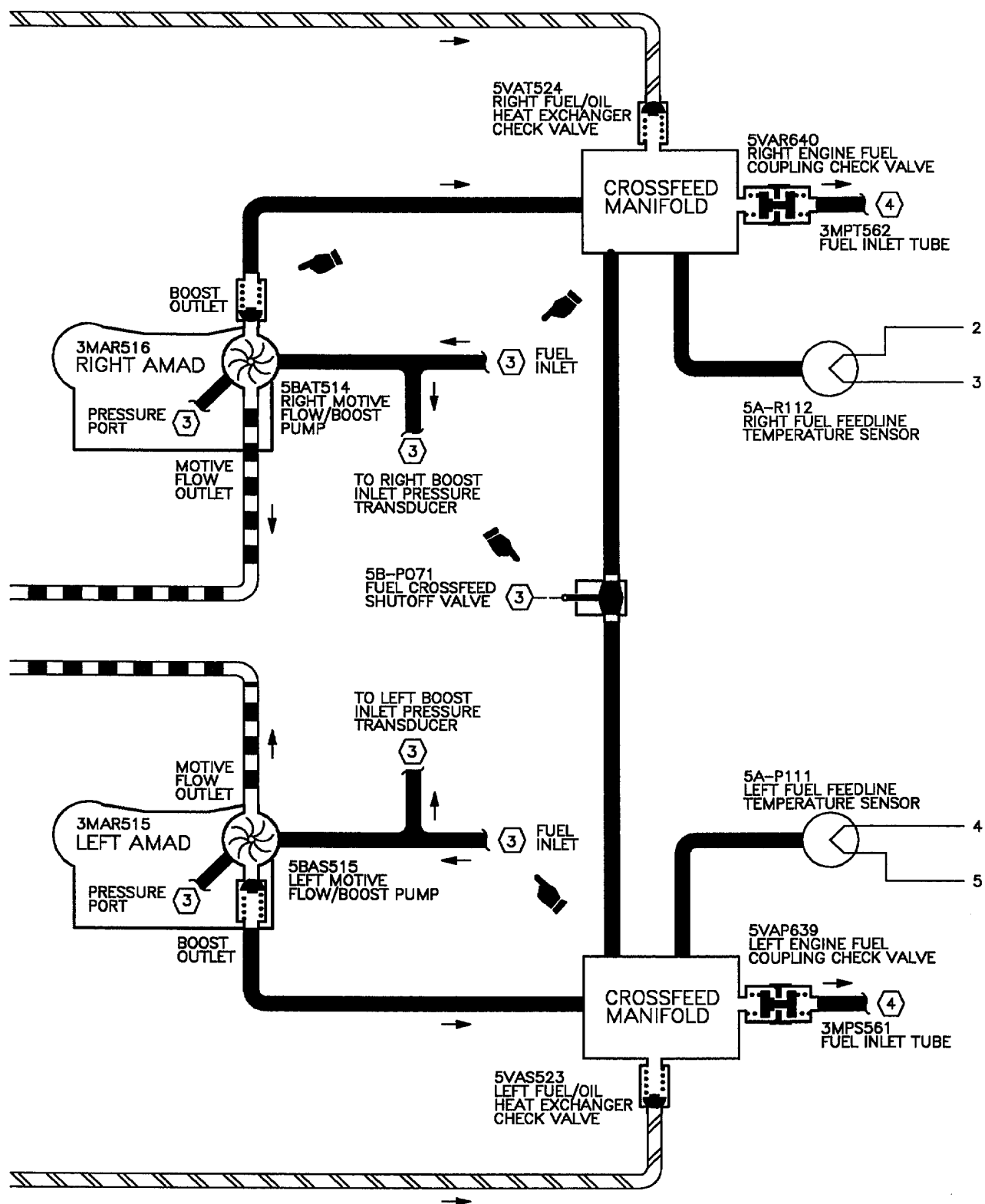


Figure 1. Hot Fuel Recirculation System Simplified Schematic (Sheet 4)

18AC-460-10-(14-4)22-CAT1

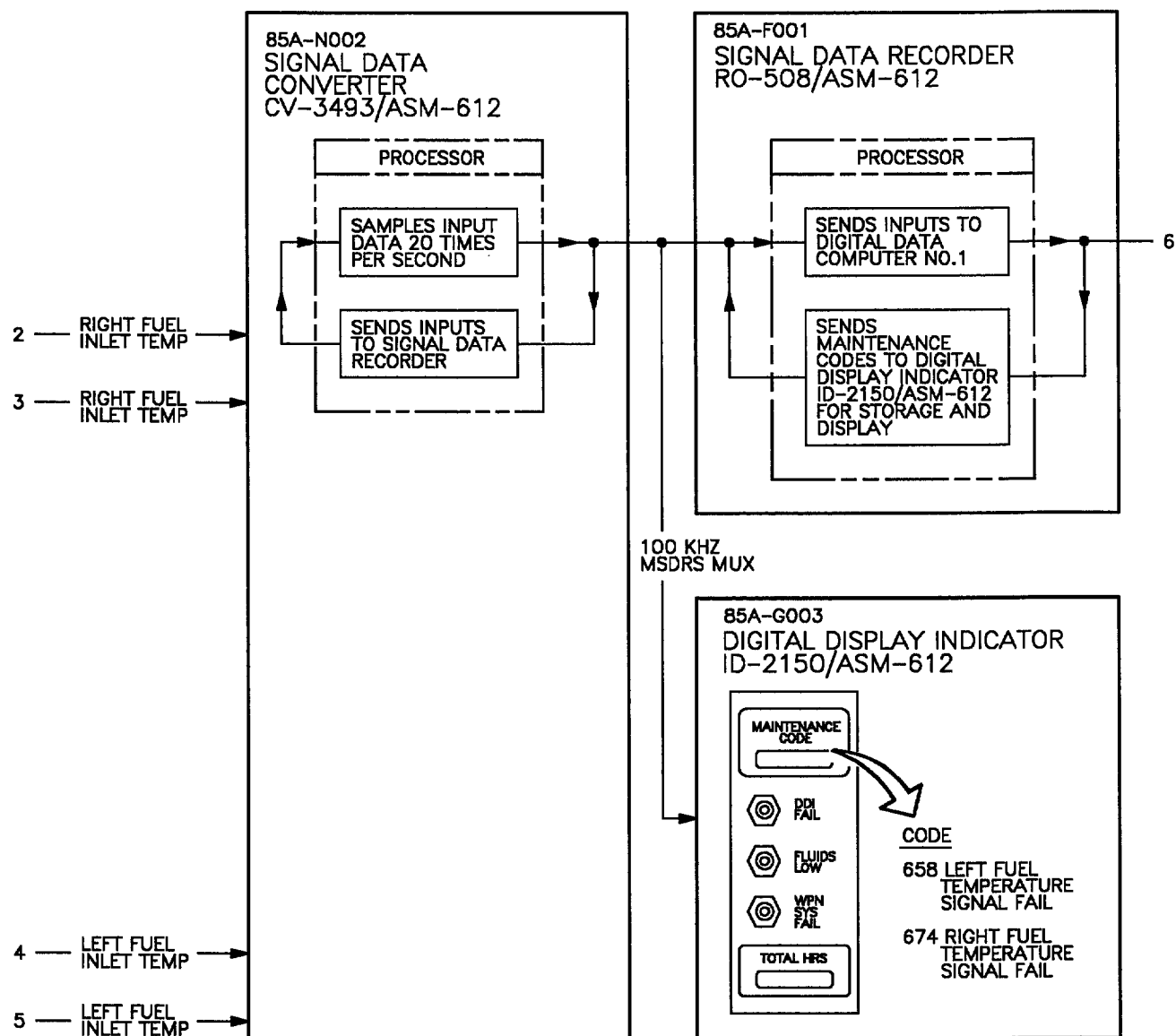


Figure 1. Hot Fuel Recirculation System Simplified Schematic (Sheet 5)

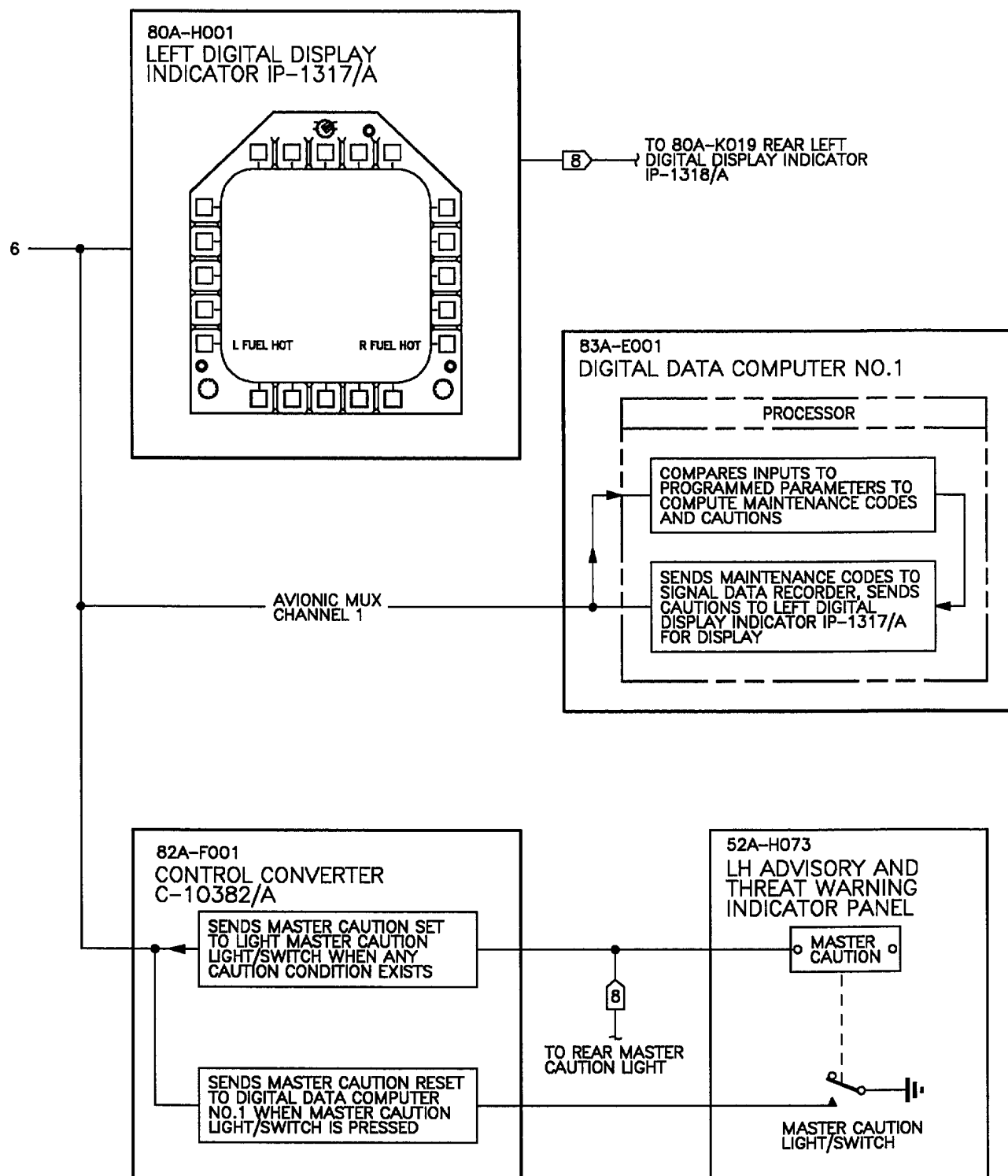
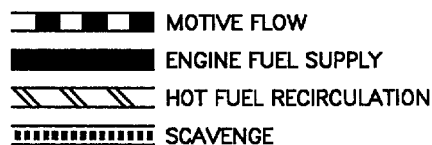


Figure 1. Hot Fuel Recirculation System Simplified Schematic (Sheet 6)

## LEGEND



## 1. NONSTANDARD SYMBOLS



TELELIGHT

- ② INTERNAL FUEL TRANSFER SYSTEM SIMPLIFIED SCHEMATIC, WP014 00.
- ③ ENGINE FUEL SUPPLY SYSTEM SIMPLIFIED SCHEMATIC, WP016 00.
- ④ BASIC ENGINE SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-270-100, WP005 00.
- ⑤ REFUEL/DEFUEL SYSTEM SIMPLIFIED SCHEMATIC, WP007 00.
- ⑥ FUEL LOW LEVEL WARNING SYSTEM SIMPLIFIED SCHEMATIC, WP023 02.
- ⑦ EXTERNAL FUEL SYSTEM SIMPLIFIED SCHEMATIC, WP011 00.
- ⑧ F/A-18B.
- ⑨ 161520 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 21.
- ⑩ 161353 THRU 161761.
- ⑪ 161353 THRU 161519 BEFORE F/A-18 AFC 18.
  
- ⑫ HYDRAULIC SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-450-100, WP003 00.
- ⑬ AMAD SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-240-100, WP006 00.
- ⑭ POWER DISTRIBUTION SIMPLIFIED SCHEMATIC, A1-F18AC-420-100, WP005 00.

Figure 1. Hot Fuel Recirculation System Simplified Schematic (Sheet 7)

## ORGANIZATIONAL MAINTENANCE

## PRINCIPLES OF OPERATION

## DESCRIPTION AND OPERATION

## FUEL PRESSURIZATION AND VENT SYSTEM

This work package supersedes WP019 00, dated 15 September 1994.

## Reference Material

Environmental Control Systems .....	A1-F18AC-410-100
Air Cycle Air Conditioning System .....	WP007 00
Fuel System .....	A1-F18AC-460-100
Refuel/Defuel System Description and Operation .....	WP005 00
External Fuel System Description and Operation .....	WP009 00
Inflight Refueling System Description and Operation .....	WP008 00
Fuel Dump System Description and Operation .....	WP017 00
Internal Fuel Transfer Description .....	WP012 00
Fuel Pressurization and Vent System Component Locator .....	WP019 01
Fuel Pressurization and Vent System Simplified Schematic .....	WP020 00
Description .....	WP003 00
Operation .....	WP003 01
Air Data Computer System .....	A1-F18AC-560-100
Description .....	WP003 00
Maintenance Status Display and Recording System .....	A1-F18AC-580-100
Operation .....	WP005 00
Mission Computer System .....	A1-F18AC-741-100
Description - System and Component .....	WP003 00
Multipurpose Display Group .....	A1-F18AC-745-100
Description .....	WP003 00

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## Record of Applicable Technical Directives

None

## ■ 1. DESCRIPTION. (WP003 00)

2. **SYSTEM DESCRIPTION.** The fuel pressurization and vent system maintains a positive pressure on fuel in all tanks. This positive pressure:

a. Prevents tearing and stretching of bladder tanks.

b. Reduces loss of fuel because of vaporization at high altitudes.

3. Each fuel tank is climb and dive vented to a common vent line that goes to the fuselage vent tank. The fuselage vent tank is vented through lines that go to vertical stabilizer vent tanks. The stabilizer vent tanks are vented through vent ports on the outboard side of each vertical stabilizer.

4. Vent lines:

a. Are arranged to resist tank-to-tank transfer during maneuvering.

b. Are located to prevent spillage of fuel out of the vent ports during catapult or arrestment.

c. Relieve fuel and air pressure (preventing structural damage) if a refueling shutoff failure occurs.

5. The fuselage vent tank:

a. Collects fuel from internal spillage.

b. Collects fuel from thermal expansion.

c. Is scavenged by motive flow pressure (WP012 00).

6. The vertical stabilizer vent tank:

a. Collects fuel from internal spillage.

b. Collects fuel from thermal expansion.

c. Is scavenged by gravity feed to the fuselage vent tank.

d. Vents internal fuel system air pressure to atmosphere by way of the vent outlets (normal operation).

e. Vents spilled fuel to atmosphere by way of the vent outlets (abnormal operation/component failure).

7. **COMPONENT DESCRIPTION.** System components shown in WP019 01 and WP020 00 are described and listed below. For related component descriptions listed below, refer to applicable WP.

a. Tank Pressure/Fuel Flow Indicator (WP005 00).

b. Refuel/Defuel Shutoff Valve (WP005 00).

c. External Tank Pressurization and Vent Valve (WP009 00).

d. External Tank Pressure Relief Valve (WP009 00).

e. Wing Fuel Coupling Valve (WP009 00).

f. Wing Air Coupling Valve (WP009 00).

g. Fuselage to Pylon Fuel Coupling Valve (WP009 00).

h. External Tank to Pylon Fuel and Air Probes (WP009 00).

i. Pylon to External Fuel Tank Fuel/Air Coupling Valve (WP009 00).

8. **Climb Vent Check Valve.** The climb vent check valve is located in tank 1 vent line. During climb maneuvers, the check valve opens allowing venting of tank 1. The check valve closes during dive maneuvers to prevent fuel from entering the vent line.

9. **Dive Vent Check Valves.** The dive vent check valves are located in each fuselage tank. During dive maneuvers the check valve opens allowing venting of the fuselage tanks. The check valves close during climb maneuvers to prevent fuel from entering the vent lines.

10. **External Tanks Air Pressure Transducer.** Used in testing and troubleshooting, the external tanks air pressure transducer measures air pressure supplied to the external tanks. The air pressure signals are converted to electrical signals and read using a test set.

11. **Vent Tanks Air Pressure Transducer.** Used in testing and troubleshooting, the vent tank pressure transducer measures air or fuel pressure in the vent tank. The pressure signals are converted to electrical signals and read using a test set.



12. **Siphon Breaker Check Valve.** The siphon breaker check valve is a flapper check valve mounted at the top of the siphon tube in the vent tank. The check valve is normally open and allows air flow to and from the vent tank when the bottom of the siphon tube is submerged in fuel. This prevents negative pressure damage to the fuel tanks. The check valve closes during inverted/negative G flight preventing vent line fuel entry through the siphon breaker check valve.

13. **Pressurization System Air Pumps.** The pressurization air pumps are air pressure operated, induction (suction) pumps. The pumps provide air flow from the vertical stabilizer vent outlets to the vent tank for internal tanks pressurization. Air pressure for pump operation is supplied by the internal fuel tanks air pressure regulator (this WP).

14. **Vent Line Flame Arrestors.** The vent line flame arrestors are located on the outboard left and right vertical stabilizers. The flame arrestors prevent flames from entering the vent system.

15. **Internal Fuel Tanks Air Pressure Regulator.** The internal fuel tanks air pressure regulator is 28vdc solenoid operated, two stage regulator (WP003 01). The regulator supplies regulated air to the pressurization system air pumps (this WP).

16. **External Fuel System Air Pressure Switch 5PSI.** The 5psi external fuel system air pressure switch monitors regulated air pressure going to the external tanks. If regulated air pressure exceeds 5  $\pm$ 1psi with aircraft weight-on-wheels, an electrical signal is sent to the MSDRS for processing.

17. **External Fuel System Air Pressure Switch 34PSI.** The 34psi external fuel system air pressure switch monitors regulated air pressure going to the external tanks. If regulated air pressure exceeds 34  $\pm$ 1psi, electrical signal is sent to the MSDRS for processing.

18. **2.0PSI Air Pressure Switch.** The 2.0psi air pressure switch monitors air pressure inside the vent tank. If air pressure exceeds 2.0psi with weight-on-wheels, or is below 2.0psi with aircraft above 20,000 feet, an electrical signal is sent to the MSDRS for processing.

19. **External Tanks Air Pressure Regulator.** The external tanks air pressure regulator is a 28vdc solenoid operated regulator. The regulator supplies regulated air to the external tanks for pressurization (WP003 01).

20. **Ground Air Pressurization Connector.** The ground air pressurization connector is located in the left main landing gear wheelwell. The connector provides a quick/disconnect for external tanks air pressurization during ground operations.

21. **Ground Air Pressurization Filter.** The ground air pressurization filter traps foreign matter in the ground supplied air. The filter is located upstream of the external tanks air pressure regulator.

22. **External Fuel System Ground Test Connector.** The ground test connector is located in the left MLG wheelwell. The connector provides a disconnect to bypass the external tanks air pressure regulator to pressurize the external tanks.

23. **Bleed Air Check Valves.** There are two check valves mounted in the pressurization and vent lines. One is mounted in the line coming from the air cycle air conditioning system and the other is in the line leading to the internal fuel tanks air pressure regulator. The check valve in the air cycle air conditioning line prevents pressurizing the air cycle air conditioning system while external air is applied to the pressurization and vent system on the ground. The check valve in the internal fuel tank air pressure regulator line prevents fuel/fumes from entering the external fuel tank pressurization system if the internal fuel tank air pressure regulator fails.

24. **External Tanks Air Pressure Regulator Check Valve.** The external tanks air pressure regulator check valve is mounted in the external tank pressurization line. The check valve prevents reverse flow of air or fuel to the external tanks air pressure regulator.

25. **External Fuel System Pressurization Bleed Orifice.** The bleed orifice is mounted in the external air pressurization line. External air pressure from the regulator or ground test connector continuously bleeds through the orifice to prevent static pressure in the external fuel tank and lines.

26. **Inverted Flight Check Valves.** On 161716 AND UP, one check valve is located on tank 2 baffle and one check valve on the tank 3 baffle. During level flight the check valves are open, allowing the area beneath the baffles to be vented. During inverted flight, the check valves close, preventing fuel from draining from the baffles.

27. **Vent Outlets.** There are two vent outlets, one on each vertical stabilizer. Each outlet provides an exit port from the aircraft for air pressure (which is normal) and vented fuel (abnormal). The vent outlet scarfed surface provides a source of reduced positive air pressure if a pressurization system failure occurs.

28. **RELATED SYSTEMS.** Systems related to the fuel pressurization and vent system are listed below.

29. **Environmental Control System.** The air cycle air conditioning system (A1-F18AC-410-100, WP007 00) supplies preconditioned bleed air to the fuel pressurization and vent system. The primary heat exchanger supplies air pressure to the internal and external tanks air pressure regulators for fuel system pressurization.

30. **Maintenance Status Display and Recording System (MSDRS).** The maintenance status display and recording system receives inputs from the fuel system through the signal data converter and recorder. The MSDRS signal data recorder sends data to the mission computer system for processing. If the mission computer system detects a fuel system failure, it sends the applicable maintenance code to the MSDRS signal data recorder which sends it to the nose wheelwell Digital Display Indicator ID-2150/ASM-612 for storage and display (A1-F18AC-580-100, WP005 00).

31. **Mission Computer System.** The mission computer system receives fuel system data from the MSDRS. The mission computer system digital data computer no. 1 processes the data to determine when a fuel system failure or caution condition occurs. If a failure occurs, digital data computer no. 1 sends the applicable maintenance code to the MSDRS for storage and display. If a caution condition occurs, digital data computer no. 1 sends the caution message to the multipurpose display group for display (A1-F18AC-741-100, WP003 00).

32. **Multipurpose Display Group.** If the mission computer system detects a fuel system caution condition, it sends the caution message to the multipurpose display group. The left Digital Display Indicator IP-1317( ) and on F/A-18B, the rear left Digital Display Indicator IP-1318( ) receive and display the caution messages (A1-F18AC-745-100, WP003 00).

33. **Air Data Computer.** The air data computer energizes the internal tanks air pressure regulator second stage solenoid open if vertical load is negative or aircraft is above 20,000 feet. This increases internal tank pressurization to 2.5 to 3.5 psi (A1-F18AC-560-100, WP003 00).

34. **SYSTEM CONTROLS AND INDICATORS.** The fuel pressurization and vent system controls and indicators are listed below.

35. **Digital Display Indicator ID-2150/ASM-612.** The Digital Display Indicator ID-2150/ASM-612 in the nose wheelwell stores and displays fuel system maintenance failure code.

36. **Arresting HOOK Control.** When the arresting HOOK control handle is down, the internal/external tanks air pressure regulators are closed. This prevents the internal/external tanks from being pressurized during arrested landings.

37. **FUEL System Control Panel.** The FUEL system control panel consists of the switches listed below:

- a. EXT TANKS - WING switch (WP009 00).
- b. EXT TANKS - CTR switch (WP009 00).
- c. PROBE control switch (WP008 00).
- d. DUMP switch (WP017 00).

38. **MASTER CAUTION Light.** The MASTER CAUTION light is located on the LH advisory and threat warning indicator panel. The yellow caution light indicates a fuel system caution/advisory requiring attention but no immediate action.

39. **Digital Display Indicator IP-1317( ), IP-1318( ).** TANK PRESS and EXT TANK caution display will appear on left Digital Display Indicator IP-1317( ) in the cockpit and on F/A-18B, left Digital Display Indicator IP-1318( ) in the rear cockpit.

40. **OPERATION.**

41. **COMPONENT OPERATION.** Detailed operational descriptions are given in WP003 01 for components listed below:

a. Internal Fuel Tanks Air Pressure Regulator.

b. External Tanks Air Pressure Regulator.

42. **Pressurization System Air Pumps.** Using regulated air pressure from the internal fuel tanks air pressure regulator (WP003 01), the pressurization system air pumps produce an induced (suction) flow of ambient air through the vent outlets. This outside air is mixed with regular air and delivered to the vent tank for internal fuel tanks pressurization. When regulated air is stopped, the ambient air flows through the pumps to and from the vent outlets.

43. **SYSTEM OPERATION.** A simplified schematic in WP020 00 and component locator WP019 01 show details of the pressurization and vent system.

44. **Pressurization.** Preconditioned bleed air from the air cycle air conditioning system is used to power the pressurization system. Preconditioned air pressure is controlled by the internal and external tank air pressure regulators.

45. If the internal tanks pressurization fails, scarfed vent outlets on the vertical stabilizers will pick up outside air to pressurize the internal tanks. If external tanks pressurization fails, scarfed vent outlets on each external tank will pick up outside air to pressurize the external tanks.

46. **Internal Tanks Pressurization.** Internal pressurization is controlled by the internal fuel tanks air pressure regulator (WP003 01). While in flight, below 20,000 feet, the internal tanks are pressurized 0.4 to 0.7psi. While in flight, above 20,000 feet, the internal tanks are pressurized 2.5 to 3.5psi. The regulator is deenergized and internal tanks pressurization stops when:

a. Aircraft weight-on-wheels.

b. The in flight refueling probe is extended.

c. The HOOK control handle is down.

47. **External Tanks Pressurization.** External fuel tanks pressurization is controlled by the external tanks air pressure regulator (WP003 01). While in flight, the normally open regulator supplies 15 to 18psi to the external tanks. When energized, the regulator closes, stopping external tank pressurization. The regulator is energized closed when:

a. Aircraft is weight-on-wheels.

b. The in flight refueling probe is extended.

c. The HOOK control handle is down.

48. **Fuel Pressurization System Cautions/Codes.** Cautions are displayed on left cockpit DDI IP-1317( ), IP-1318( ) and the light MASTER CAUTION light. Codes are displayed on nose wheelwell DDI ID-2150/ASM-612. Pressurization and vent system cautions/codes are explained below.

49. **TANK PRESS.** With engine compressor speeds of 80 percent or greater, TANK PRESS is displayed if internal tank pressure is more than 2.0psi with aircraft weight-on-wheels, or less than 2.0psi at altitudes above 20,000 feet. To prevent nuisance cautions, time delays and engine RPM inhibits are used to allow the system to pressurize and depressurize.

50. **EXT TANK.** EXT TANK is displayed if the external tanks have not depressurized (within 2 minutes of weight-on-wheels condition) on the ground.

51. **Code 951.** Code that indicates external tank pressurization system is overpressurized. (Code can be set with or without external tanks on board.)



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**ORGANIZATIONAL MAINTENANCE**  
**PRINCIPLES OF OPERATION**  
**COMPONENT LOCATOR**  
**FUEL PRESSURIZATION AND VENT SYSTEM**

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**Reference Material**

None

**Alphabetical Index**

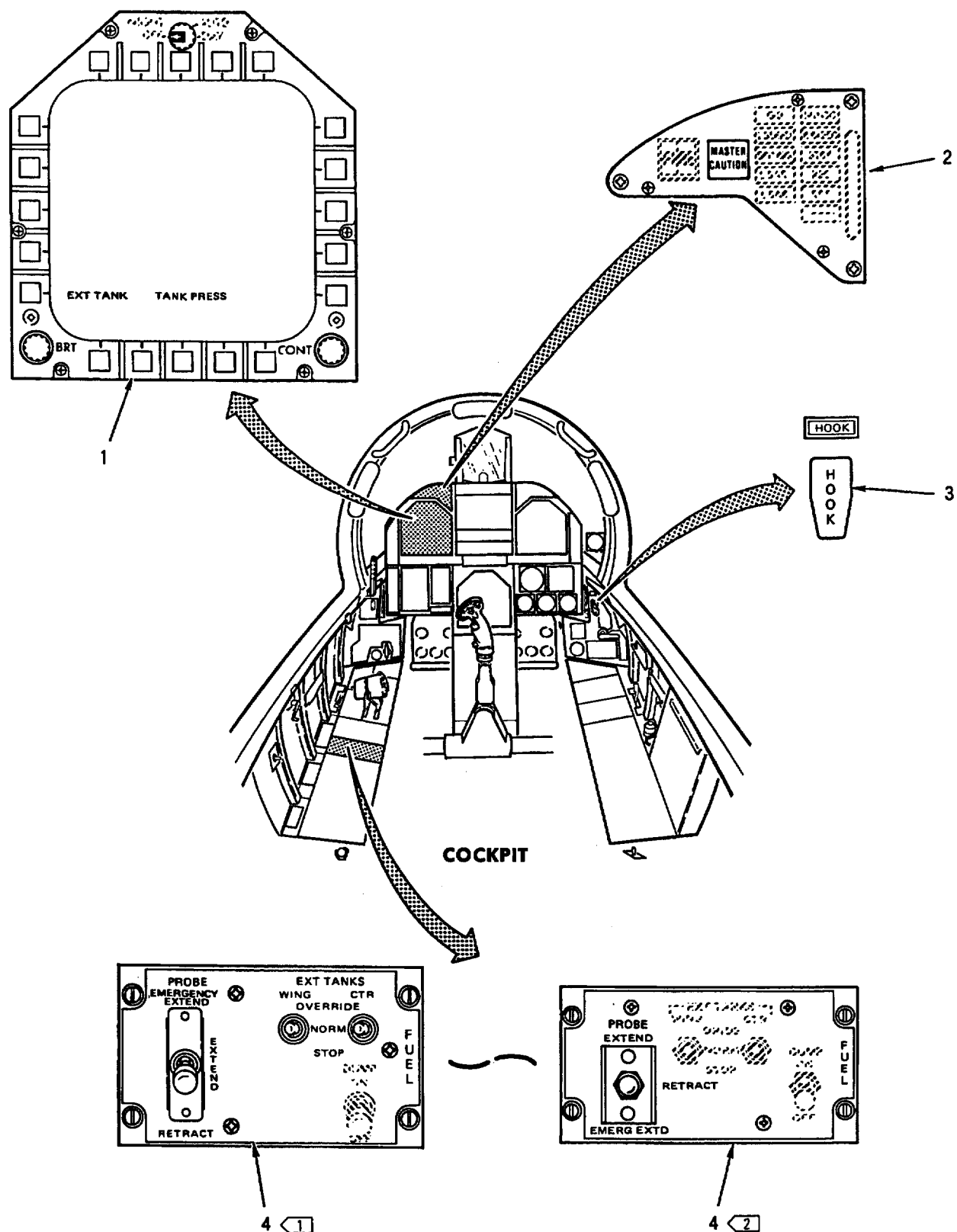
**Subject**

**Page No.**

Fuel Pressurization and Vent System Component Locator, Figure 1 ..... 2

**Record of Applicable Technical Directives**

<b>Type/ Number</b>	<b>Date</b>	<b>Title and ECP No.</b>	<b>Date Incorp.</b>	<b>Remarks</b>
F/A-18 AFC 53	27 Mar 85	Elimination of Tanks 1 and 4 Sneak Circuit, Tank 4 Motive Flow Shutoff Valve, and Raised Inverted Baffle (ECP-MDA-F/A-18-00055/C1)	15 Jun 86	-
F/A-18 AFC 41	-	Throttle Thrust Sensitivity, Reduction of (ECP- MDA-F/A-18-00054C1)	1 Nov 86	-



18AC-460-10-(33-1)H

Figure 1. Fuel Pressurization and Vent System Component Locator (Sheet 1)

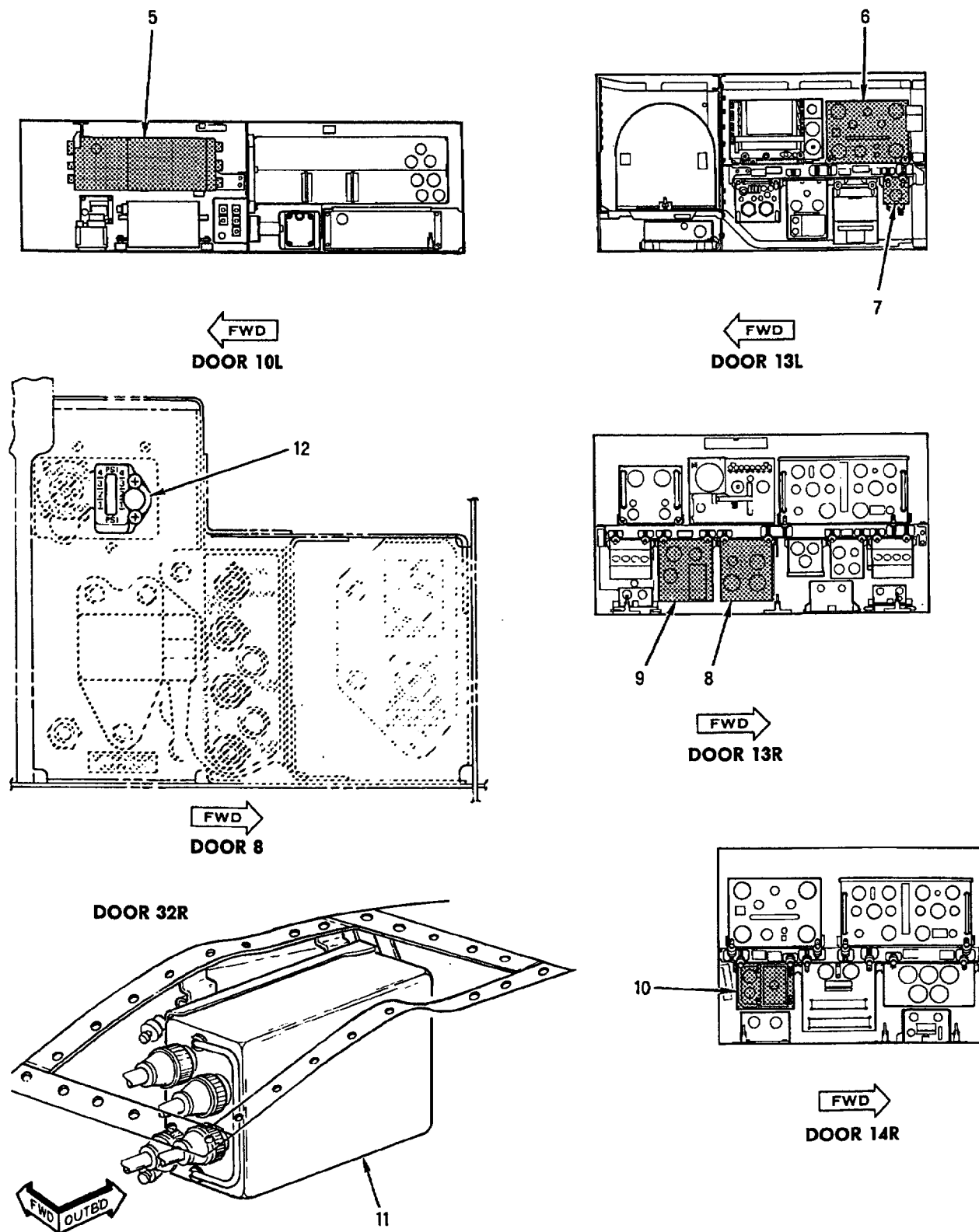
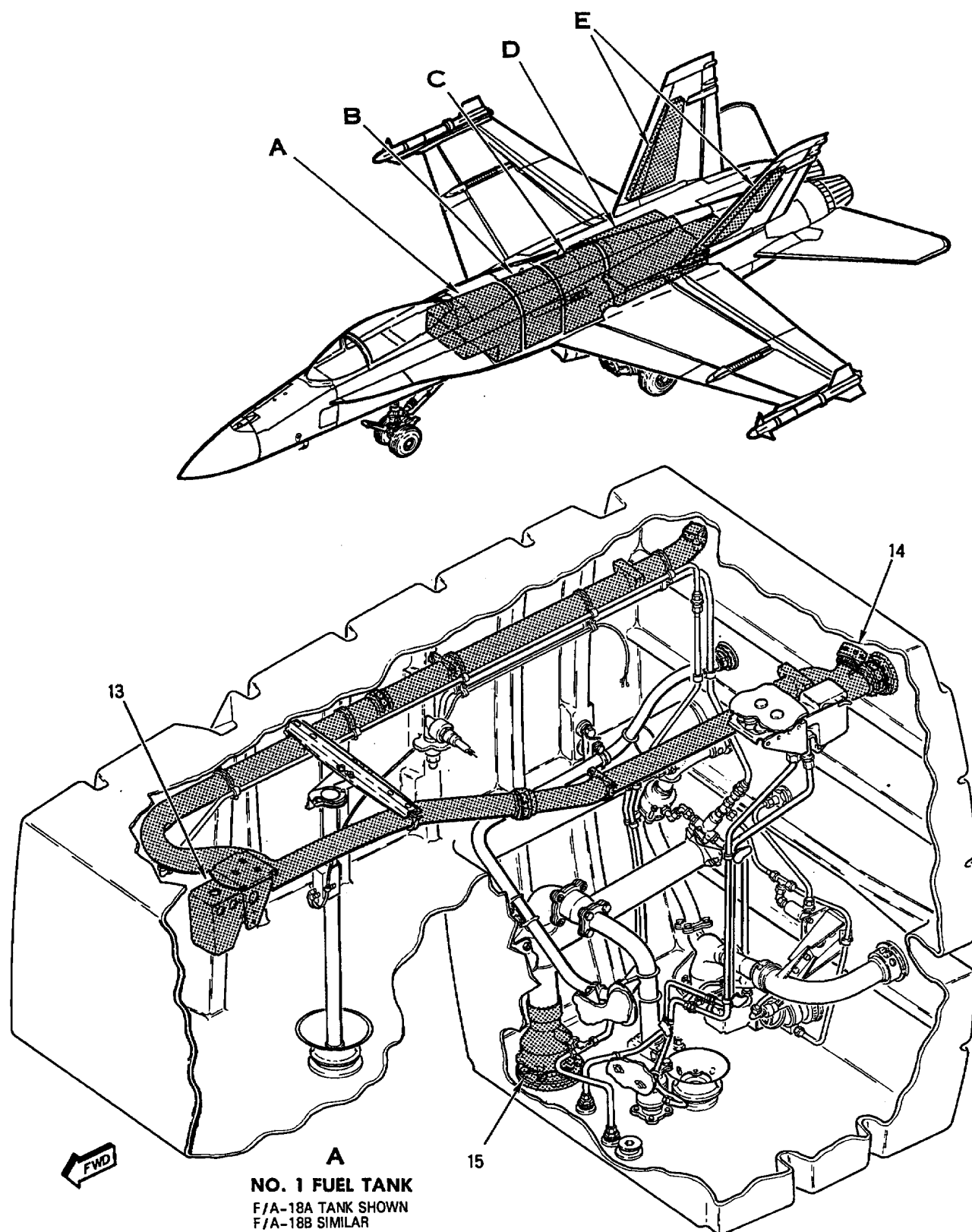


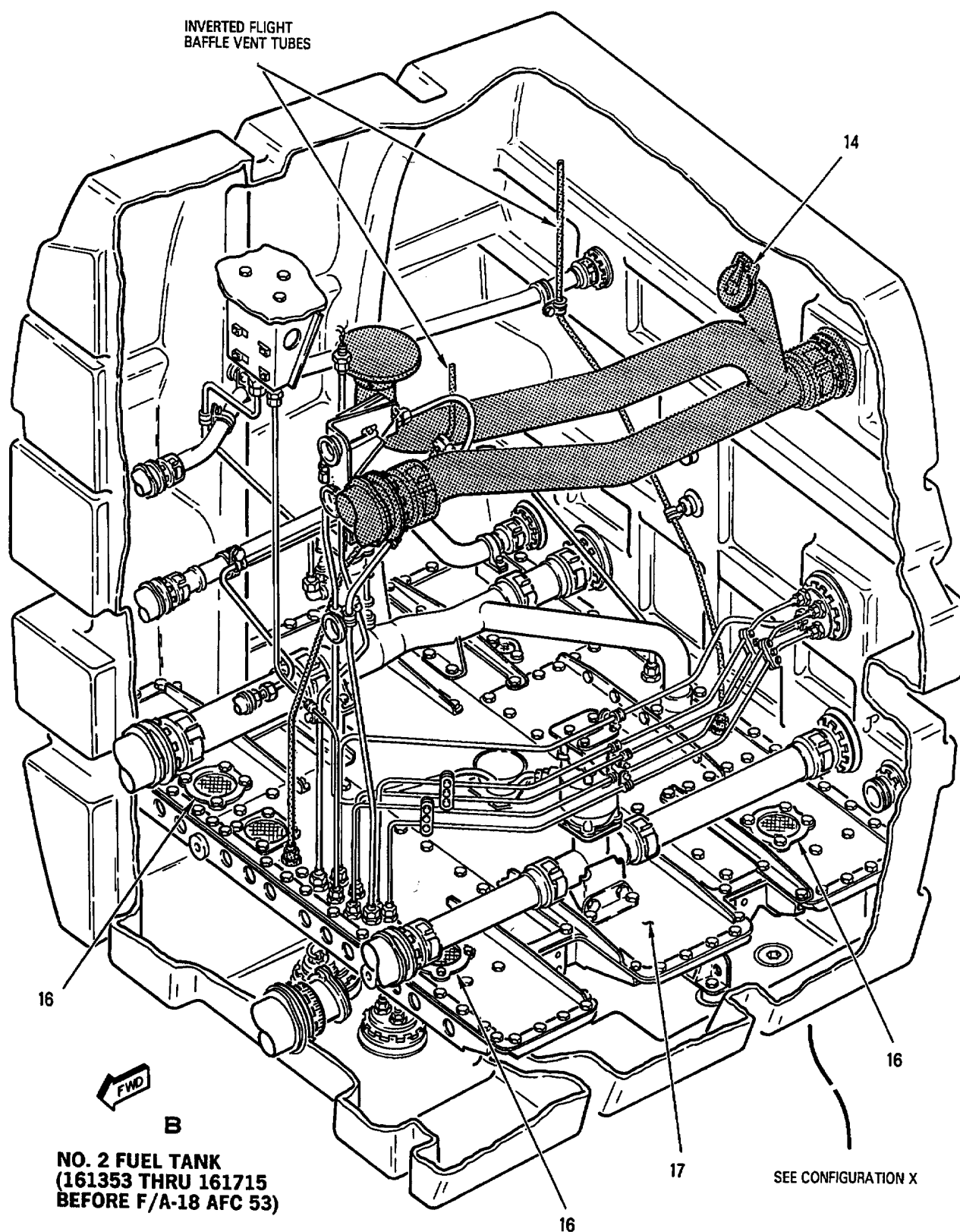
Figure 1. Fuel Pressurization and Vent System Component Locator (Sheet 2)



18AC-460-10-(33-3)J

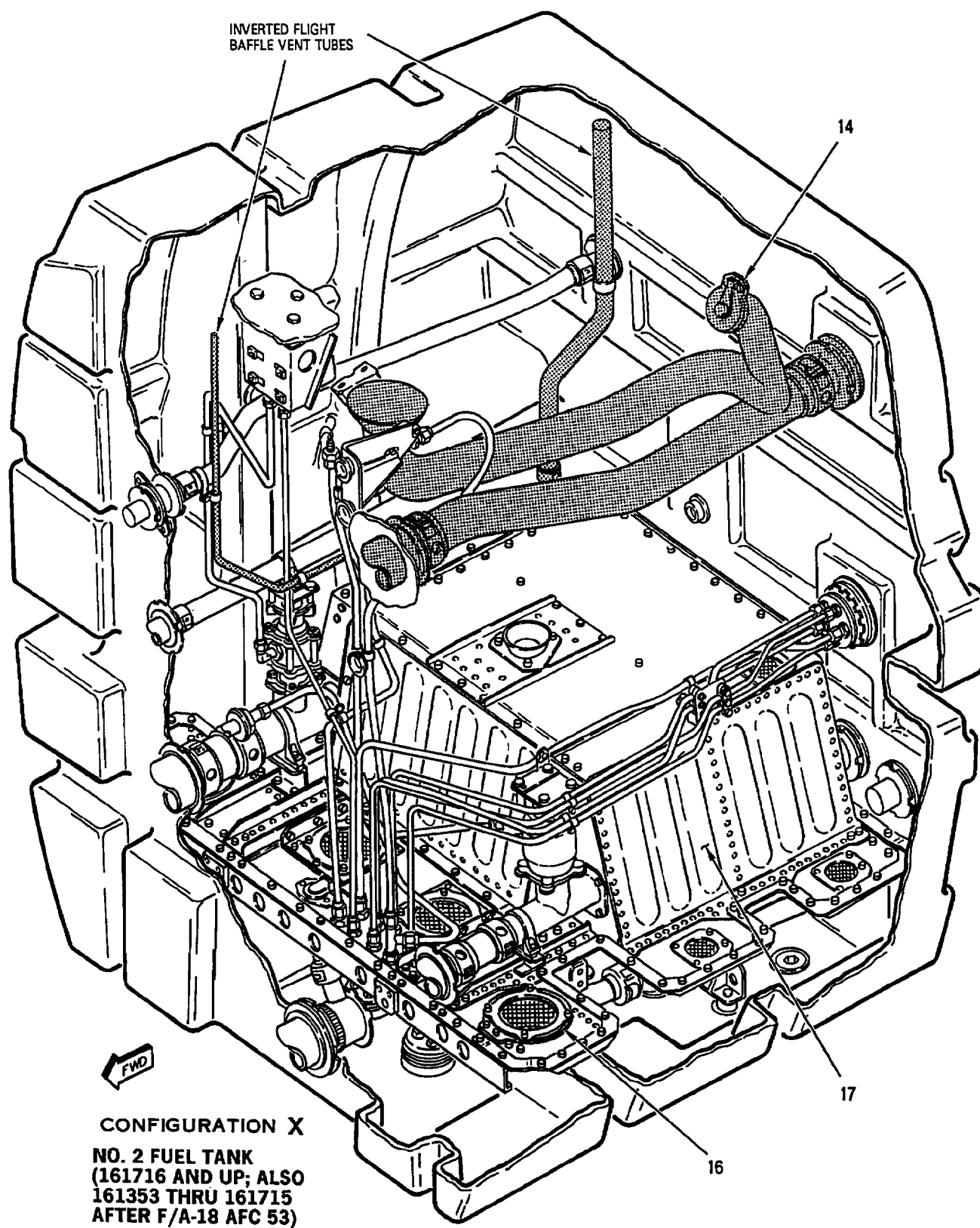
Figure 1. Fuel Pressurization and Vent System Component Locator (Sheet 3)





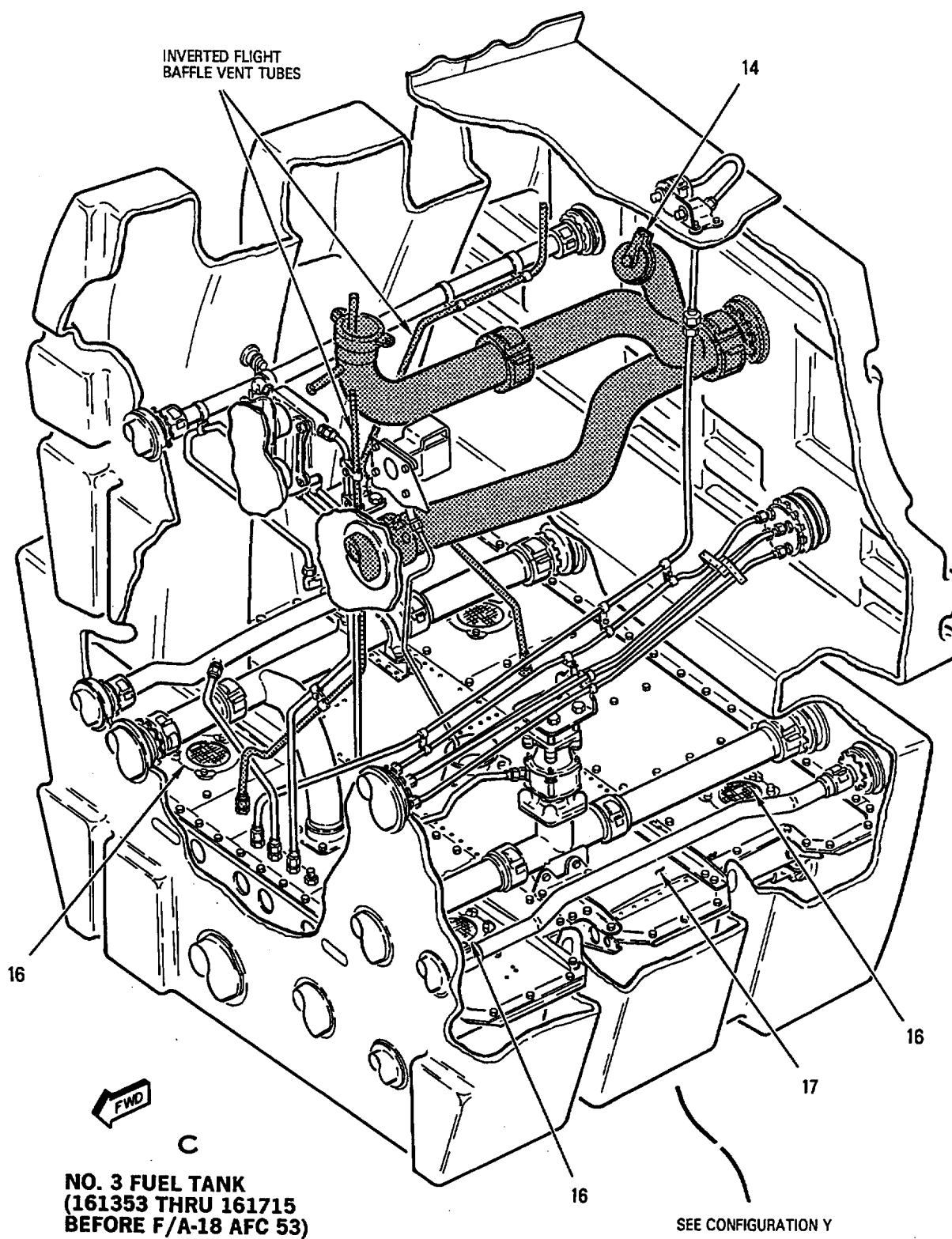
18AC-460-10-(33-4)22

Figure 1. Fuel Pressurization and Vent System Component Locator (Sheet 4)



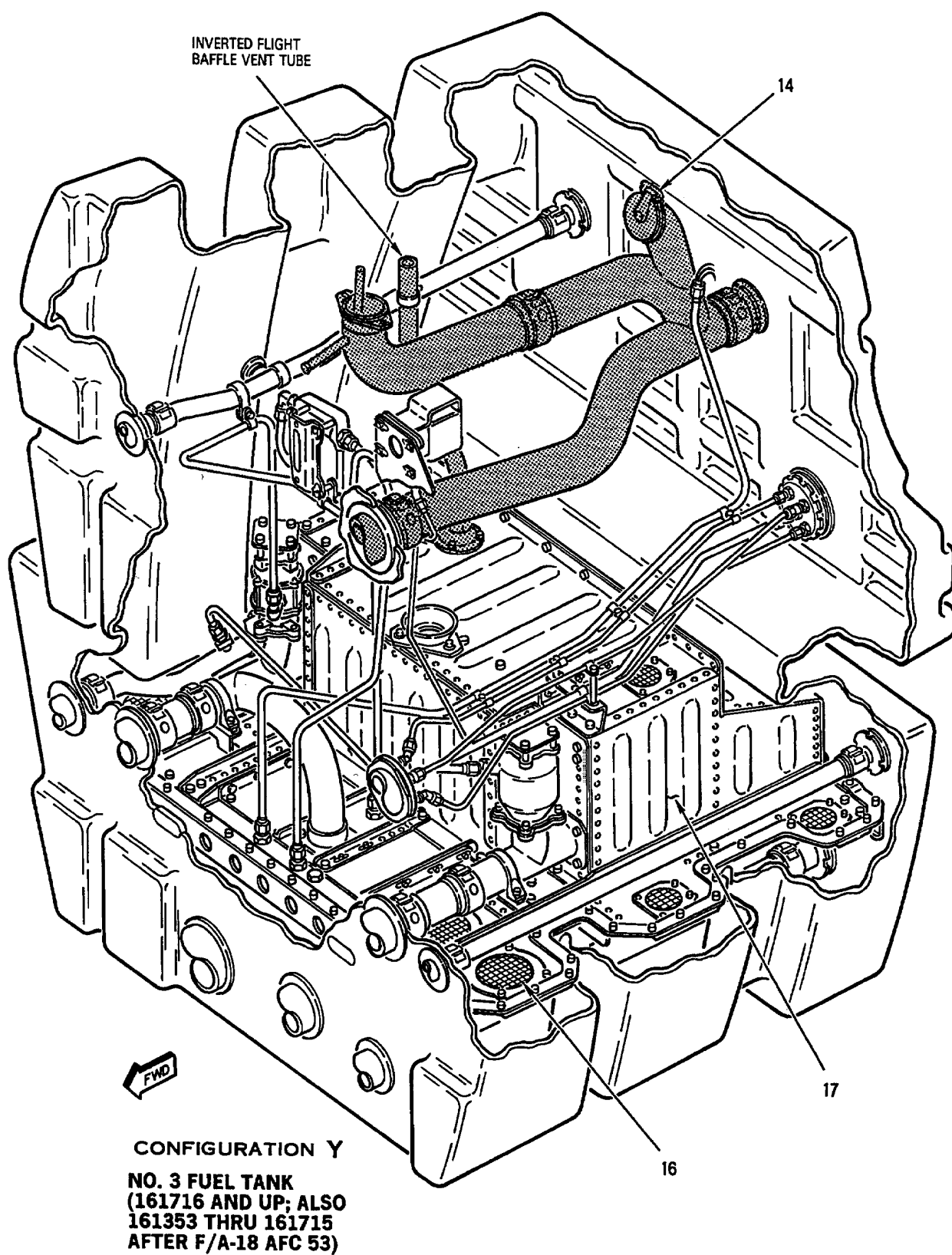
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Figure 1. Fuel Pressurization and Vent System Component Locator (Sheet 5)



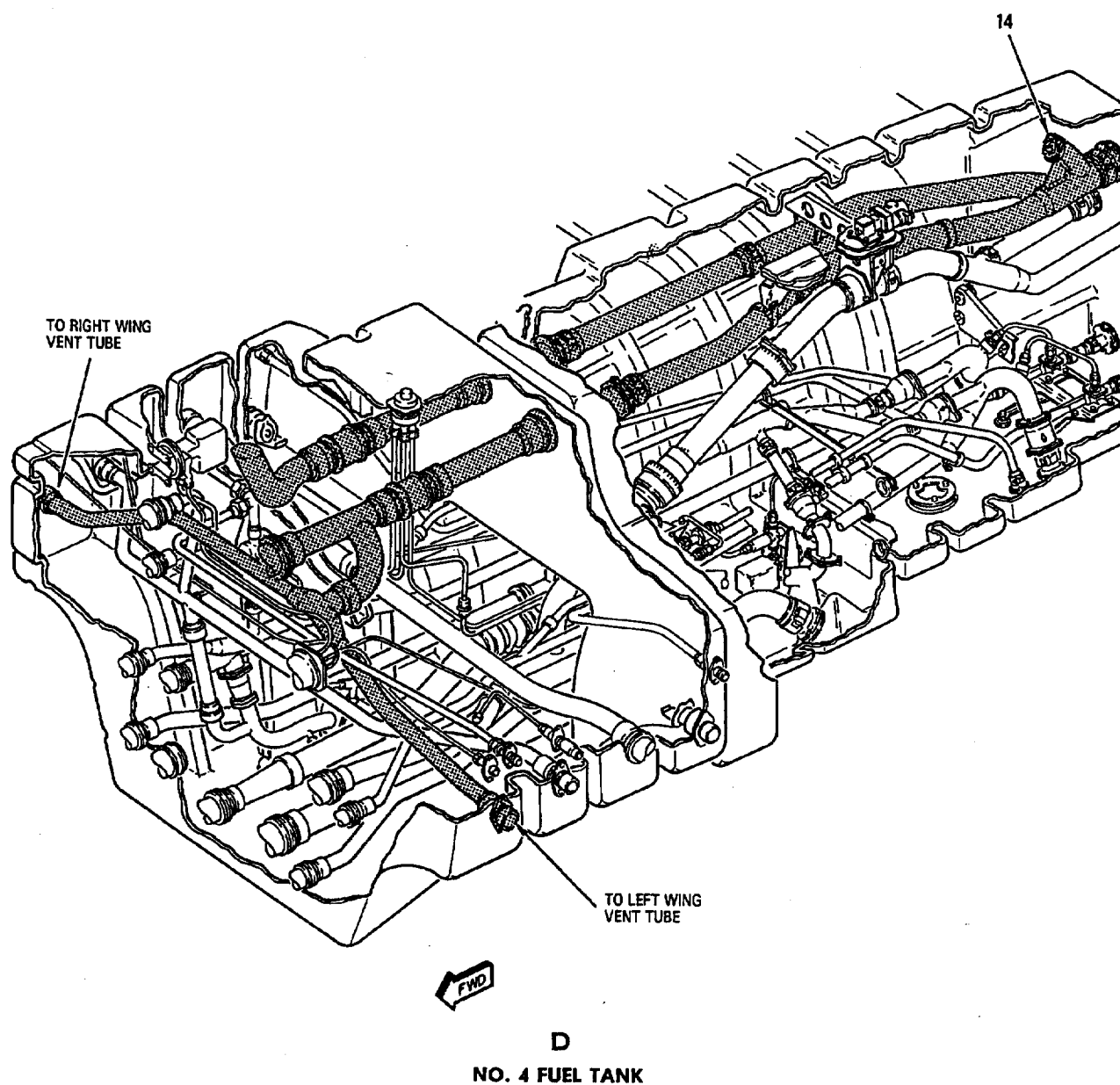
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Figure 1. Fuel Pressurization and Vent System Component Locator (Sheet 6)



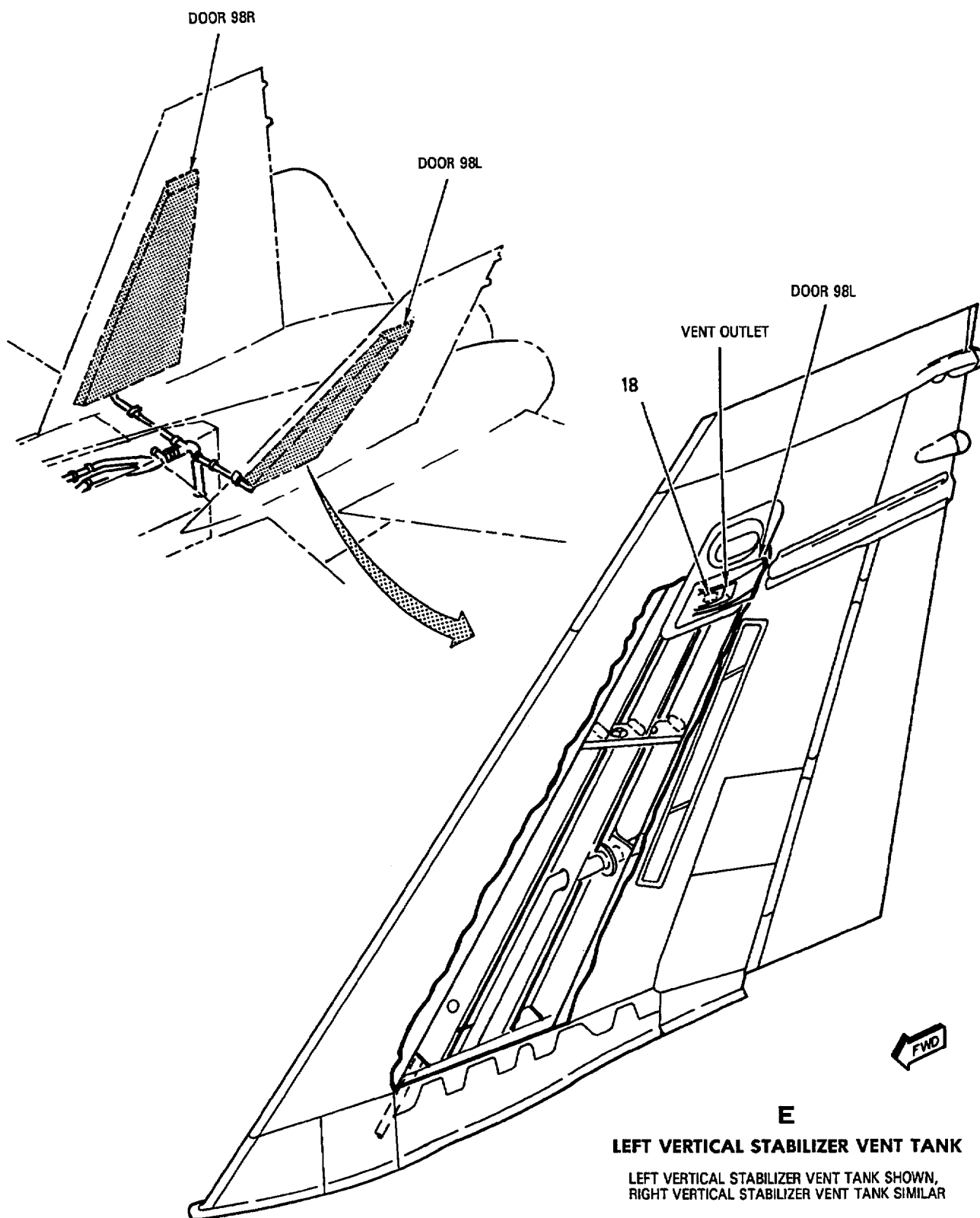
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Figure 1. Fuel Pressurization and Vent System Component Locator (Sheet 7)



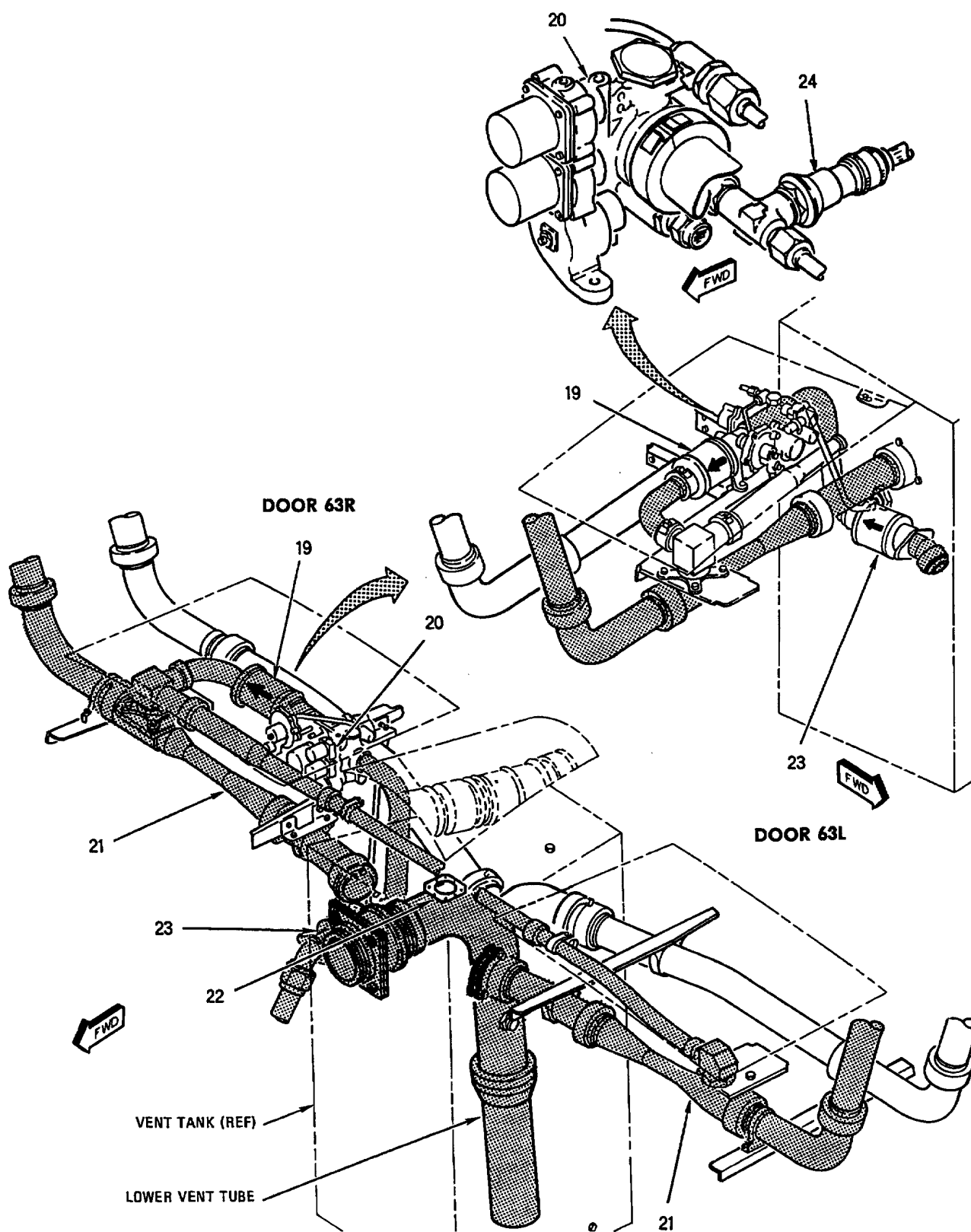
18AC-460-10-(33-8)H

Figure 1. Fuel Pressurization and Vent System Component Locator (Sheet 8)



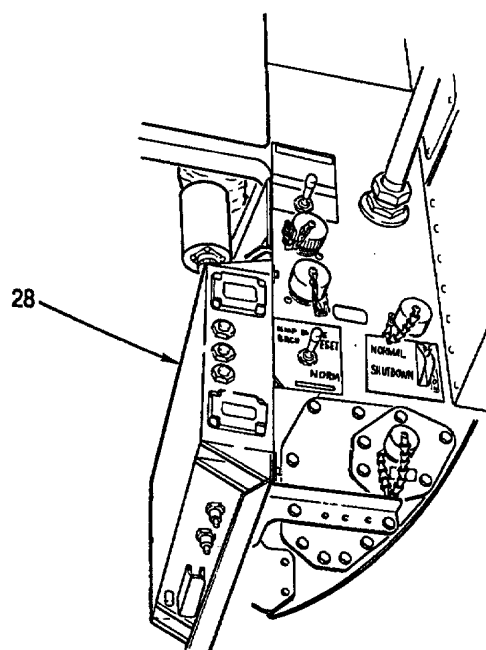
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Figure 1. Fuel Pressurization and Vent System Component Locator (Sheet 9)

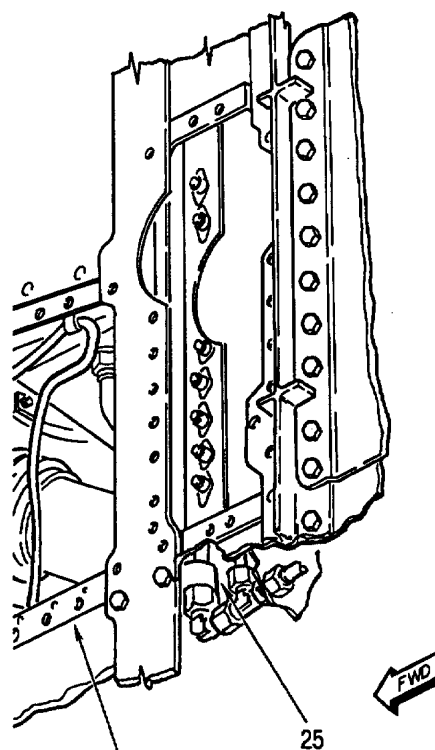


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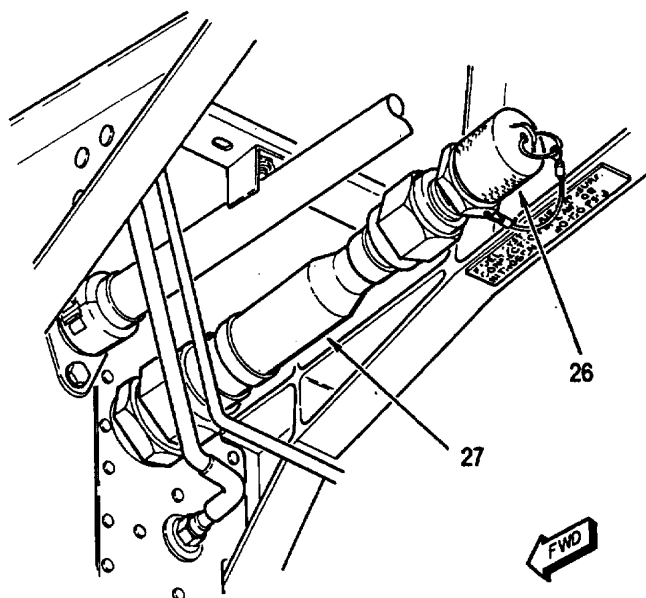
Figure 1. Fuel Pressurization and Vent System Component Locator (Sheet 10)



**NOSE WHEELWELL, LEFT SIDE**  
LOOKING AFT AND OUTBD



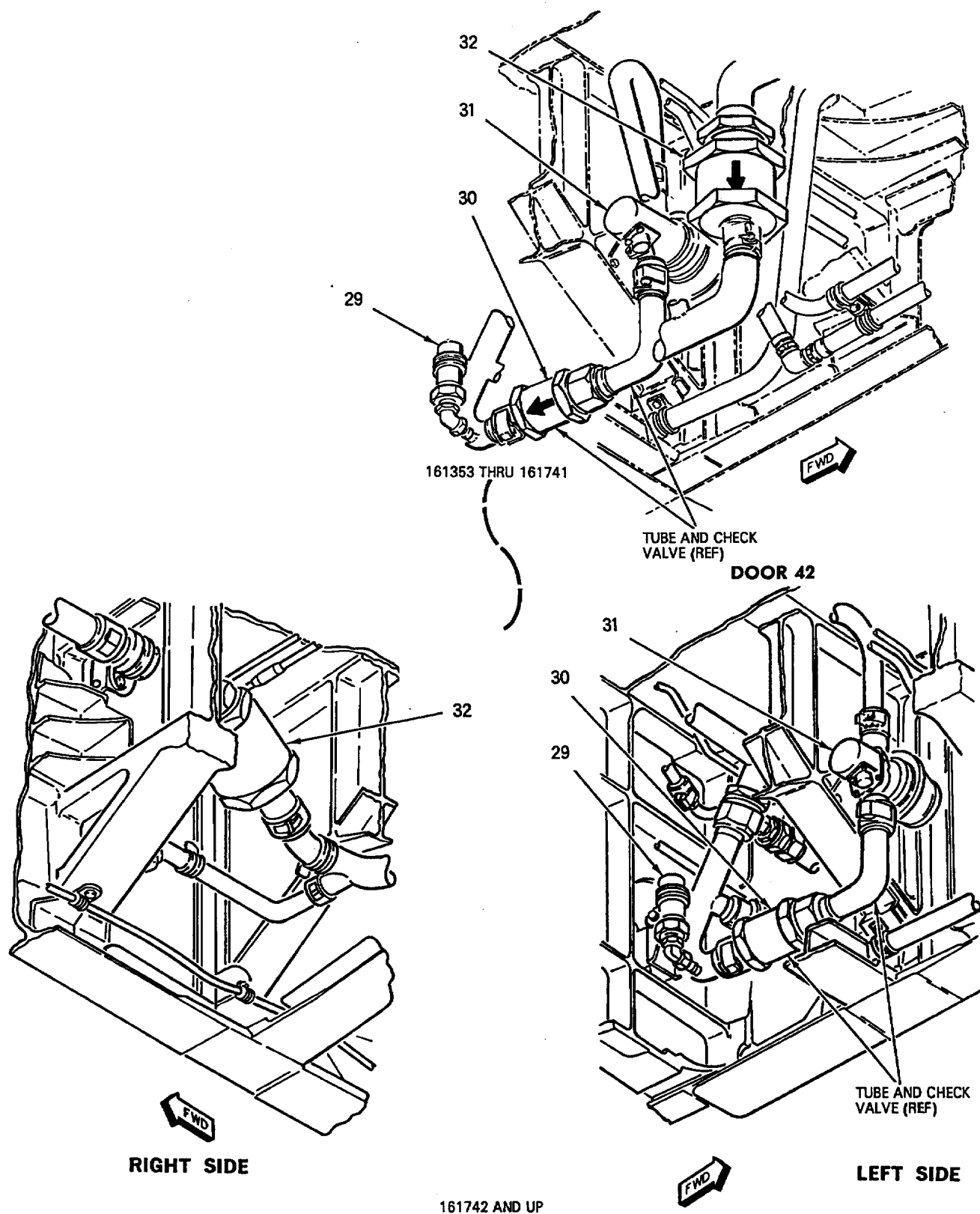
INTERNAL DOOR EBB  
**DOOR 64L**



**LEFT MLG WHEELWELL**

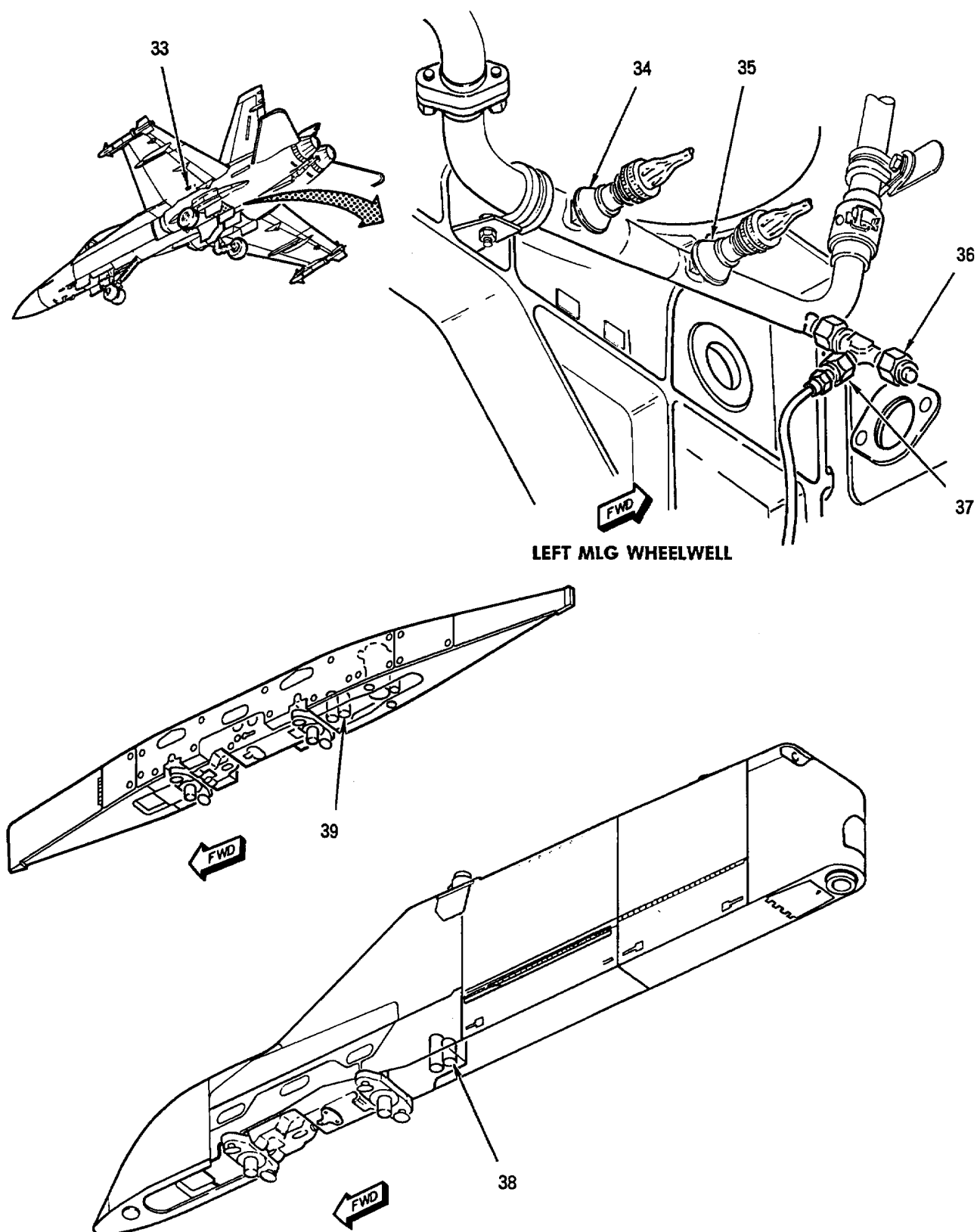
**Figure 1. Fuel Pressurization and Vent System Component Locator (Sheet 11)**





18AC-460-10-(33-12)19

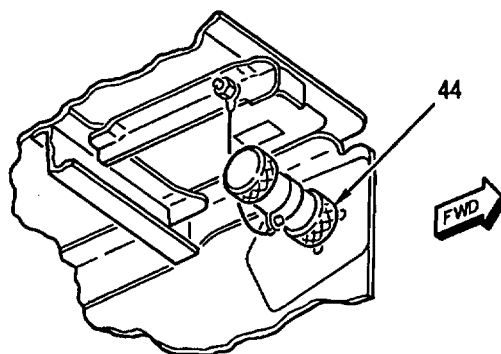
Figure 1. Fuel Pressurization and Vent System Component Locator (Sheet 12)



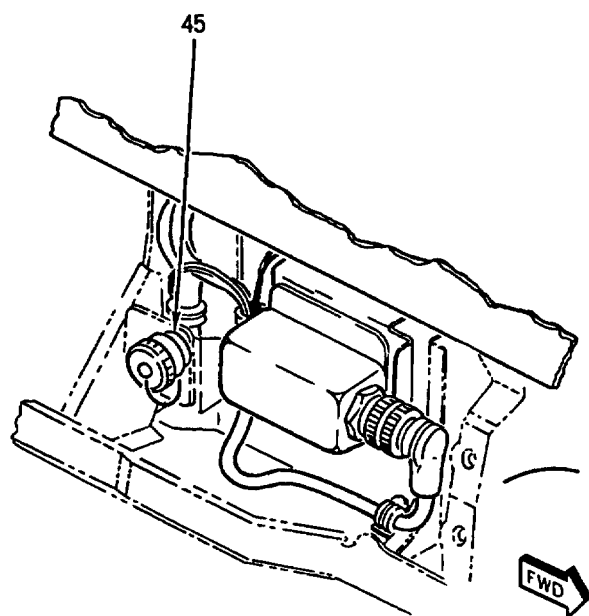
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Figure 1. Fuel Pressurization and Vent System Component Locator (Sheet 13)

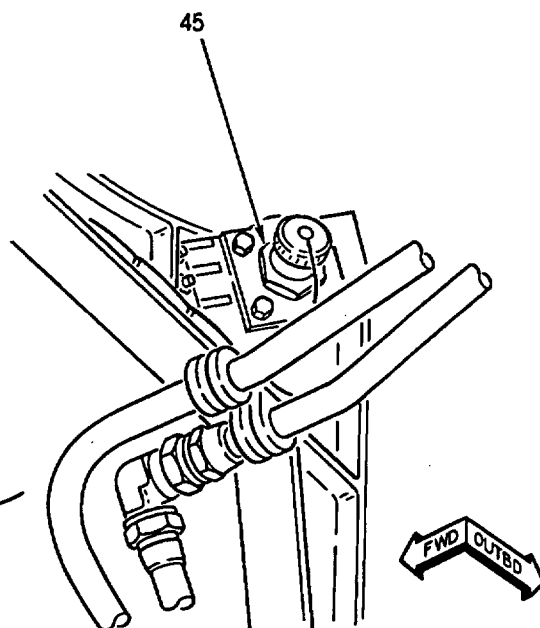




NOSE WHEELWELL, LEFT SIDE



DOOR 46R  
161353 THRU 161944



RIGHT MLG WHEELWELL  
161945 AND UP

Figure 1. Fuel Pressurization and Vent System Component Locator (Sheet 15)

## LEGEND

- 1 161353 THRU 161528 BEFORE F/A-18 AFC 41.  
 2 161702 AND UP; ALSO 161353 THRU 161528 AFTER F/A-18 AFC 41.

Nomenclature	Index No.	Ref Des
AIR DATA COMPUTER CP-1334/A	8	70A-F001
AIR PRESSURE SWITCH (2 PSI)	24	5S-T106
ARRESTING HOOK CONTROL HANDLE	3	19A-J003
BLEED AIR CHECK VALVE	32	5VAT506
BLEED AIR CHECK VALVE	23	5VAT507
CENTERLINE PYLON TO EXTERNAL TANK FUEL/AIR COUPLING VALVE	39	5VAZ629
CLIMB VENT CHECK VALVE	13	5VAP531
CONTROL CONVERTER C-10382/A	9	82A-F001
DIGITAL DATA COMPUTER NO. 1	6	83A-E001
DIGITAL DISPLAY INDICATOR ID-2150/ASM-612	28	85A-G003
DIVE VENT CHECK VALVE	14	
NO. 1 FUEL TANK		5VAP530
NO. 2 FUEL TANK		5VAP593
NO. 3 FUEL TANK		5VAP582
NO. 4 FUEL TANK		5VAP555
EXTERNAL FUEL SYSTEM AIR PRESSURE SWITCH (5 PSI)	35	5S-P151
EXTERNAL FUEL SYSTEM AIR PRESSURE SWITCH (34 PSI)	34	5S-P152
EXTERNAL FUEL SYSTEM GROUND TEST CONNECTOR	36	
EXTERNAL FUEL SYSTEM PRESSURIZATION BLEED ORIFICE	37	5VAP654
EXTERNAL FUEL TANK AIR PRESSURE REGULATOR	31	5L-P102
EXTERNAL FUEL TANK TO PYLON AIR PROBE	41	5VAY642
EXTERNAL FUEL TANK TO PYLON FUEL PROBE	42	5VAY637
EXTERNAL FUEL TANK PRESSURE RELIEF VALVE	43	5VAY641

Figure 1. Fuel Pressurization and Vent System Component Locator (Sheet 16)

Nomenclature	Index No.	Ref Des
EXTERNAL FUEL TANK PRESSURIZATION AND VENT VALVE	40	5VAY630
EXTERNAL TANKS AIR PRESSURE REGULATOR CHECK VALVE	30	5VAR620
EXTERNAL TANKS AIR PRESSURE TRANSDUCER	29	5MTR130
FUEL GROUND TEST RECEPTACLE	45	5J-R135
FUEL QUANTITY TEST RECEPTACLE	44	5J-G024
FUEL SYSTEM CONTROL PANEL	4	5A-H027
EXT TANKS WING SWITCH		5S-H017
EXT TANKS CTR SWITCH		5S-H018
PROBE CONTROL SWITCH		5S-H005
GROUND AIR PRESSURIZATION CONNECTOR	26	5PAP636
GROUND AIR PRESSURIZATION FILTER	27	5FAP638
INTERNAL AIR PRESSURIZATION CHECK VALVE	19	5VAT513
INTERNAL FUEL TANKS AIR PRESSURE REGULATOR	20	5L-T104
INVERTED FLIGHT BAFFLE	17	
NO. 2 FUEL TANK		5CAP516
NO. 3 FUEL TANK		5CAP517
INVERTED FLIGHT VENT CHECK VALVE	16	
NO. 2 FUEL TANK		5VAR677
NO. 3 FUEL TANK		5VAR678
LEFT DIGITAL DISPLAY INDICATOR IP-1317/A	1	80A-H001
LH ADVISORY AND THREAT WARNING INDICATOR PANEL	2	52A-H073
NO. 3 RELAY PANEL ASSEMBLY	7	52A-E059
LMG WOW RELAY NO. 4		12K-E020
NO. 8 CIRCUIT BREAKER RELAY PANEL ASSEMBLY	5	52A-C159
EXTERNAL TANK REFUEL CONTROL RELAY		5K-C107
FUEL TK PRESS CIRCUIT BREAKER (ZONE A6)		5CBC101
20K FT RELAY		5K-C103

Figure 1. Fuel Pressurization and Vent System Component Locator (Sheet 17)

Nomenclature	Index No.	Ref Des
PRESSURIZATION SYSTEM AIR PUMP LEFT RIGHT	21	5BAS511 5BAT512
REFUEL/DEFUEL SHUTOFF VALVE	15	5VAP533
SIGNAL DATA CONVERTER CV-3493 ASM-612	11	85A-N002
SIGNAL DATA RECORDER RO-508/ASM-612	10	85A-F001
SIPHON BREAKER CHECK VALVE	22	5VAS545
TANK PRESSURE FUEL FLOW INDICATOR	12	5DSD625
VENT LINE FLAME ARRESTOR LEFT VERTICAL STABILIZER RIGHT VERTICAL STABILIZER	18	5MPS504 5MPT505
VENT TANK PRESSURE TRANSDUCER	25	5MTT129
WING PYLON TO EXTERNAL TANK FUEL AIR COUPLING VALVE	38	5VAW623
WING AIR COUPLING VALVE LEFT RIGHT	33	5VAU577 5VAV578

Figure 1. Fuel Pressurization and Vent System Component Locator (Sheet 18)





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**ORGANIZATIONAL MAINTENANCE**  
**PRINCIPLES OF OPERATION**  
**SIMPLIFIED SCHEMATIC**  
**FUEL PRESSURIZATION AND VENT SYSTEM**

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**Reference Material**

None

**Alphabetical Index**

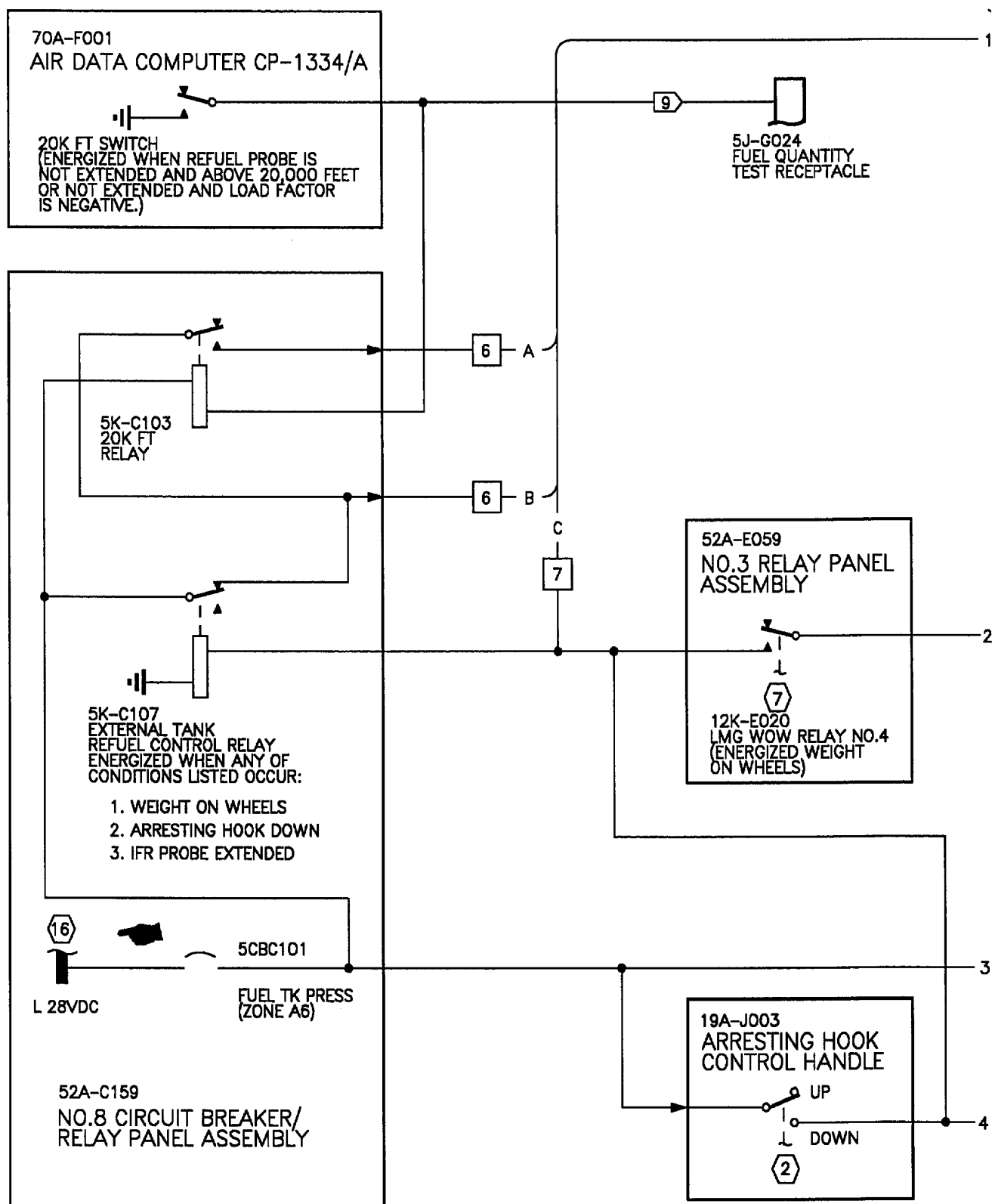
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**Page No.**

Fuel Pressurization and Vent System Simplified Schematic, Figure 1 ..... 2

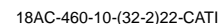
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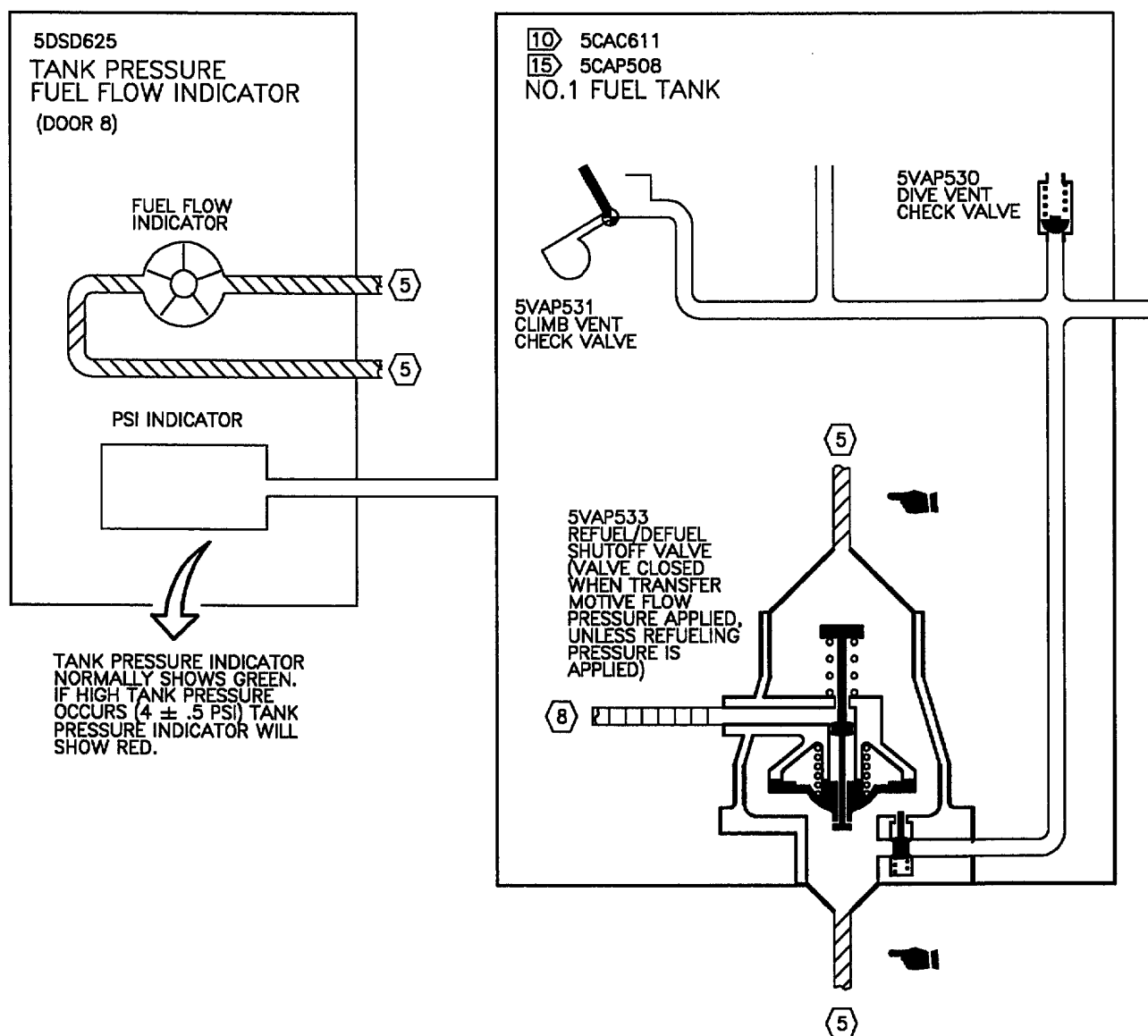
18AC-460-10-(32-1)22-CATI

Figure 1. Fuel Pressurization and Vent System Simplified Schematic (Sheet 1)



**Figure 1. Fuel Pressurization and Vent System Simplified Schematic (Sheet 2)**

1 1



18AC-460-10-(32-3)22-CATI

Figure 1. Fuel Pressurization and Vent System Simplified Schematic (Sheet 3)

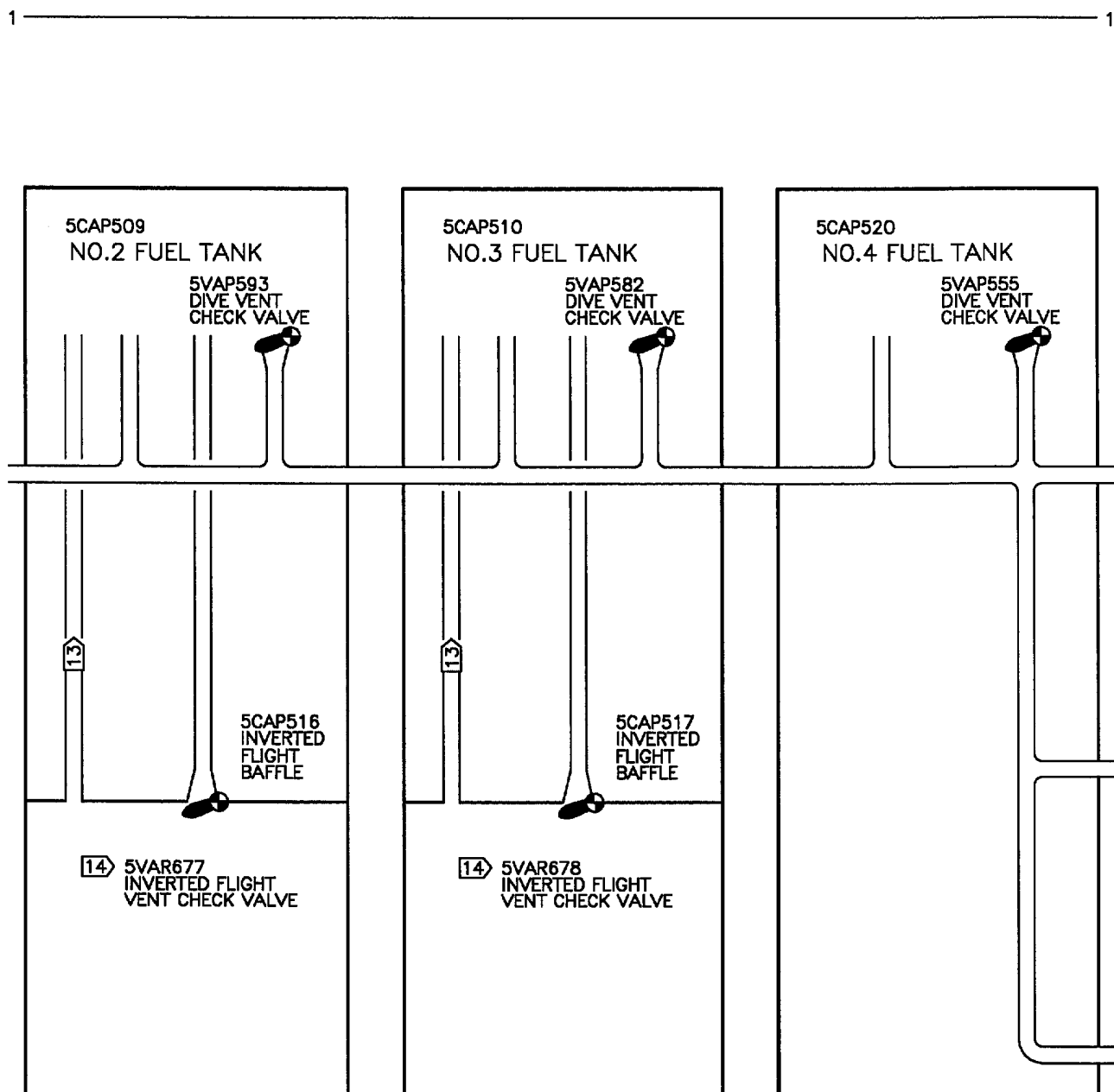


Figure 1. Fuel Pressurization and Vent System Simplified Schematic (Sheet 4)

1 ————— 1

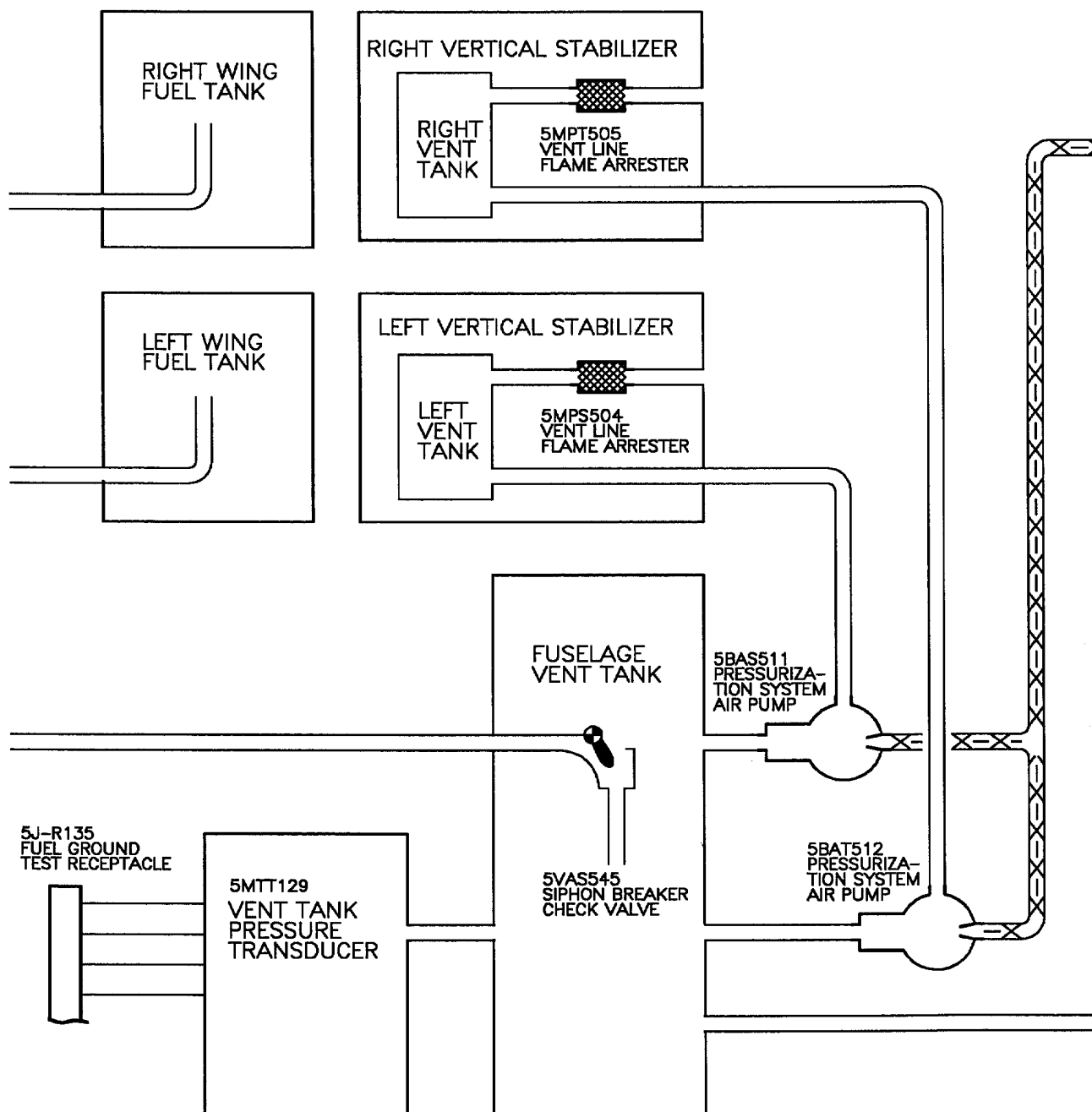
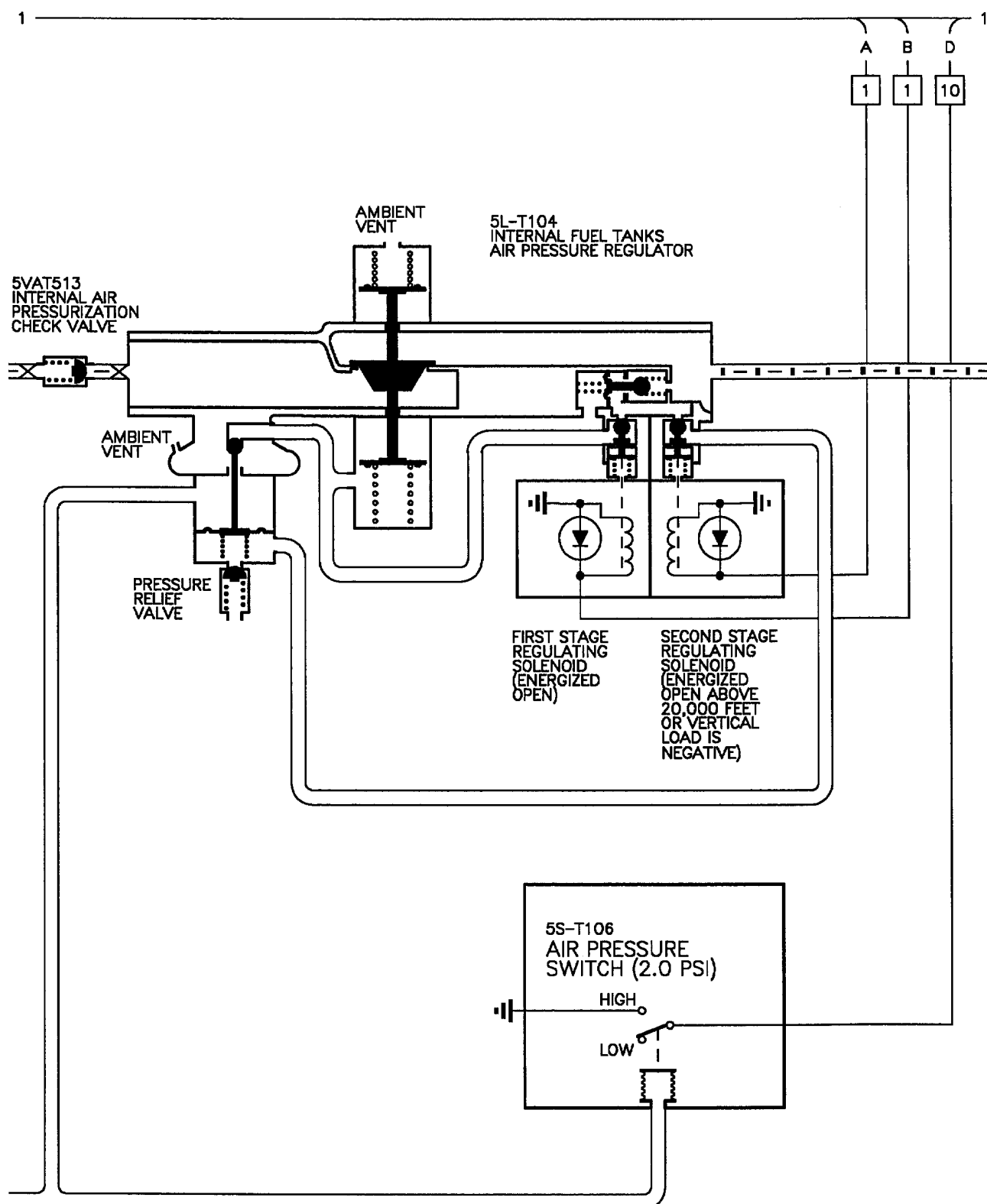


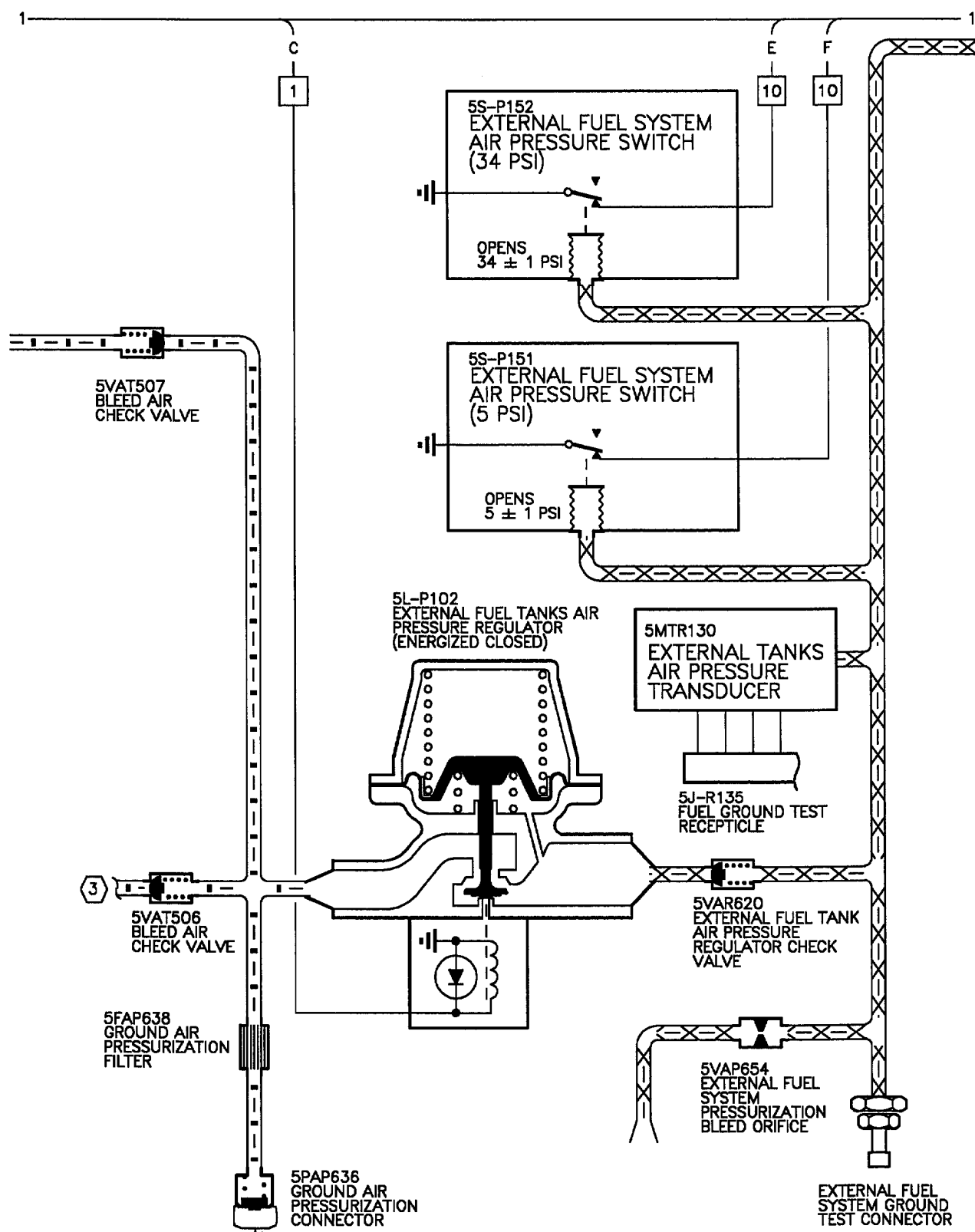
Figure 1. Fuel Pressurization and Vent System Simplified Schematic (Sheet 5)

18AC-460-10-(32-5)G-CATI



18AC-460-10-(32-6)22-CAT1

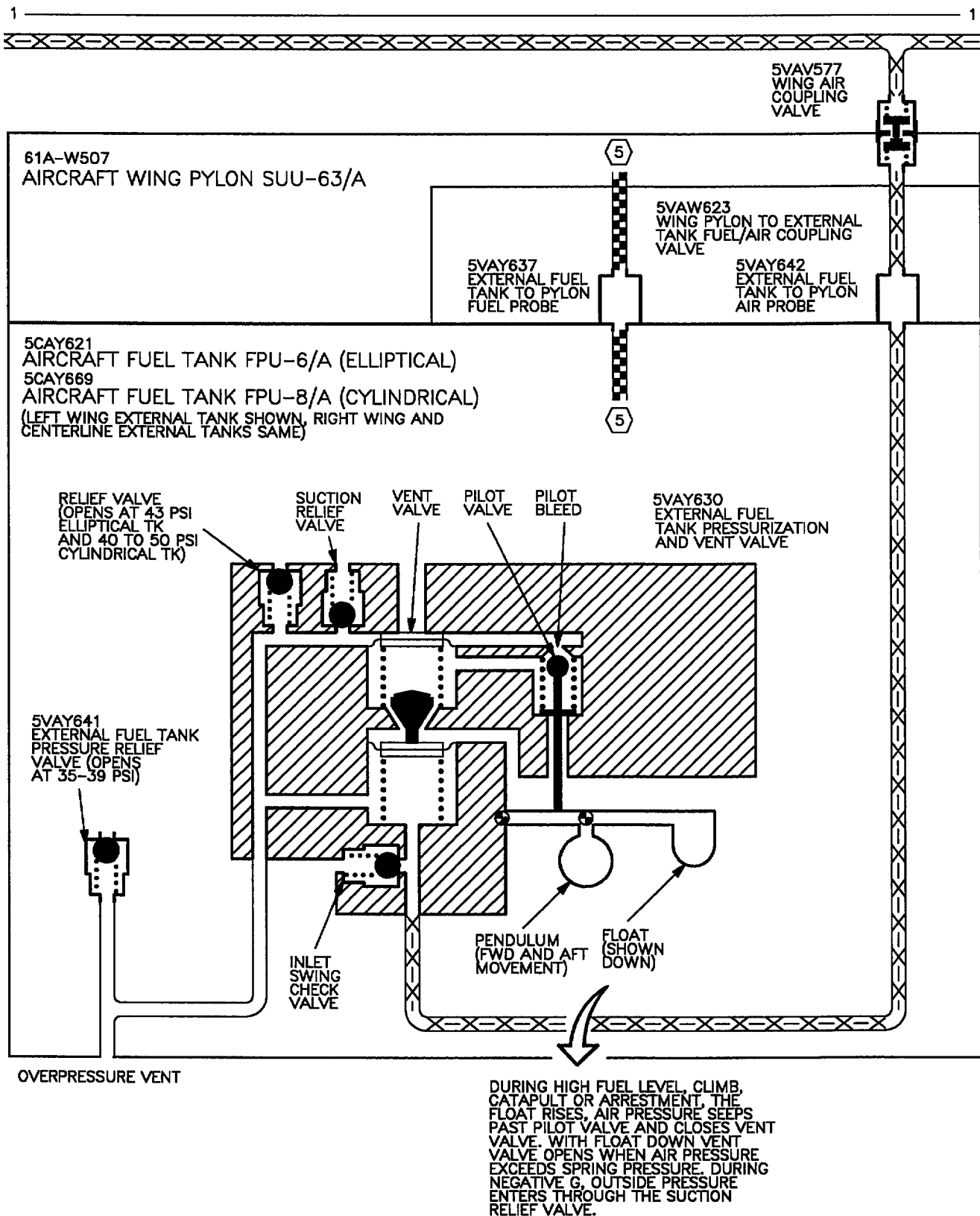
Figure 1. Fuel Pressurization and Vent System Simplified Schematic (Sheet 6)



18AC-460-10-(32-7)G-CAT1

Figure 1. Fuel Pressurization and Vent System Simplified Schematic (Sheet 7)





18AC-460-10-(32-8)F-CATI

Figure 1. Fuel Pressurization and Vent System Simplified Schematic (Sheet 8)

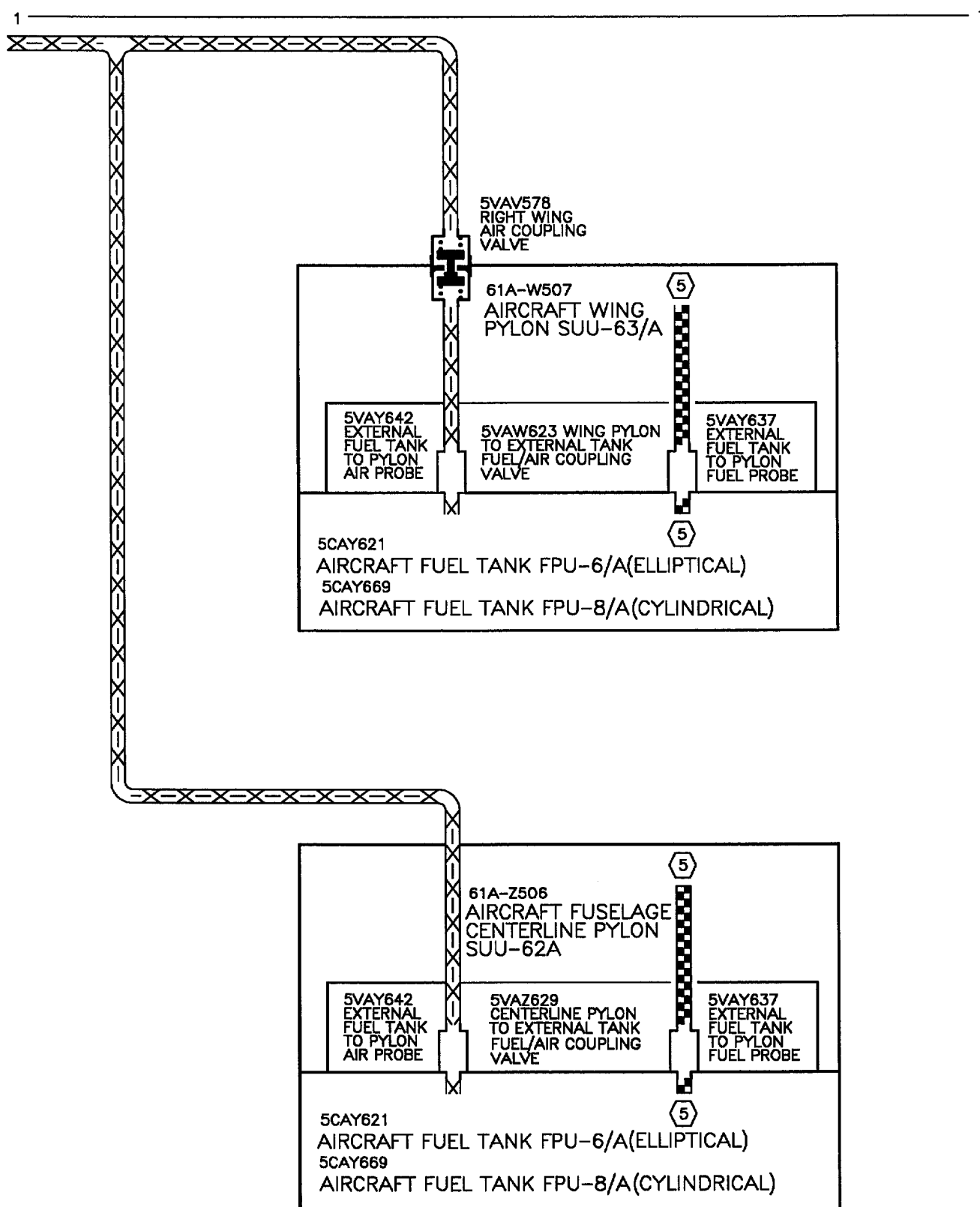


Figure 1. Fuel Pressurization and Vent System Simplified Schematic (Sheet 9)

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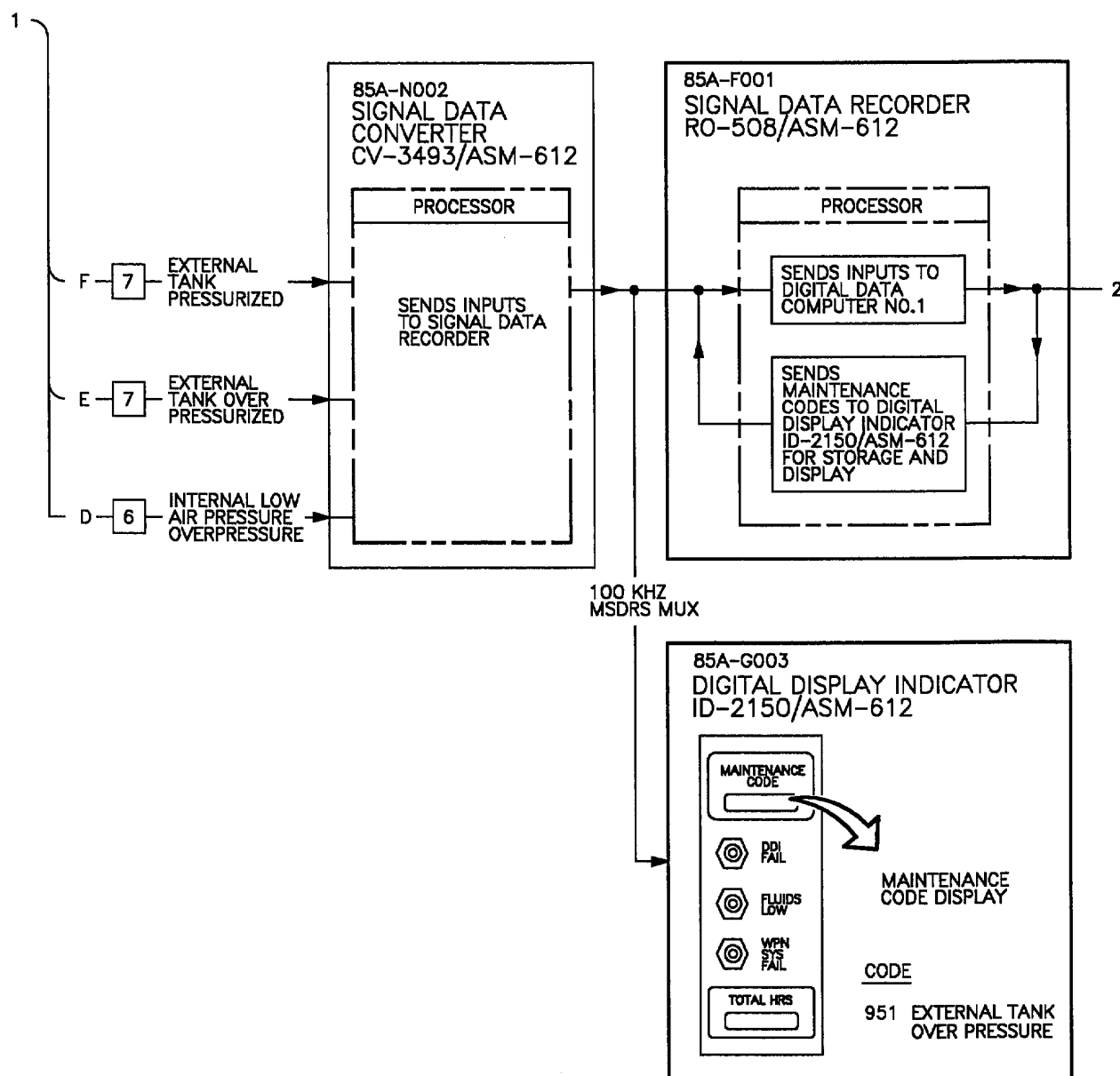
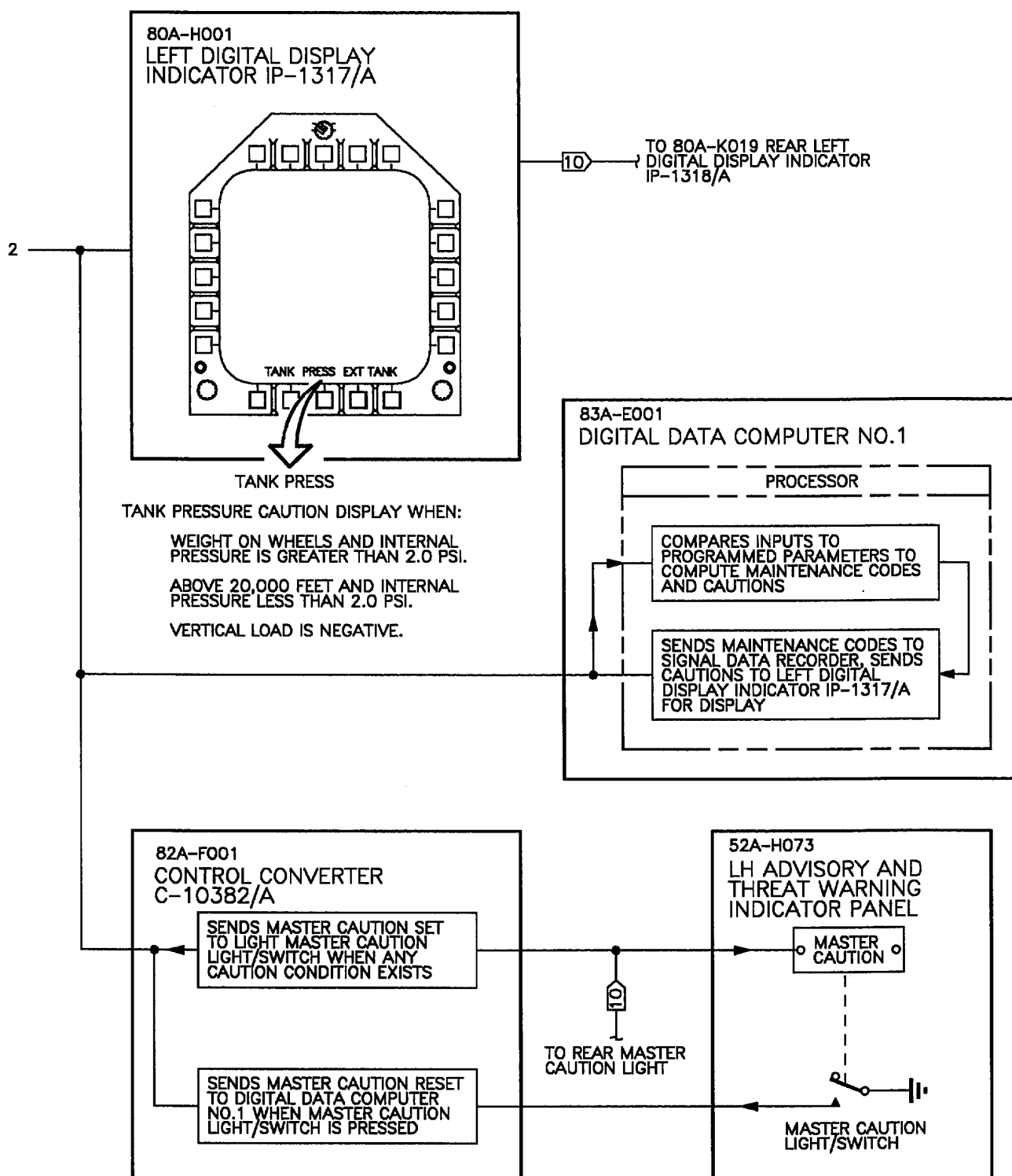



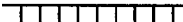
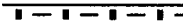



Figure 1. Fuel Pressurization and Vent System Simplified Schematic (Sheet 10)



18AC-460-10-(32-11)F-CATI

Figure 1. Fuel Pressurization and Vent System Simplified Schematic (Sheet 11)

## LEGEND

	VENT
	TRANSFER MOTIVE FLOW
	PRECONDITIONED BLEED AIR
	REFUEL
	REGULATED AIR
	REFUEL/TRANSFER

## 1. NONSTANDARD SYMBOLS

 TELELIGHT
















-  ARRESTING GEAR SIMPLIFIED SCHEMATIC, A1-F18AC-130-100, WP010 00.
-  AIR CYCLE AIR CONDITIONING SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-410-100, WP007 00.
-  EXTERNAL FUEL SYSTEM SIMPLIFIED SCHEMATIC, WP011 00.
-  REFUEL/DEFUEL SYSTEM SIMPLIFIED SCHEMATIC, WP007 00.
-  INFLIGHT REFUEL SYSTEM SIMPLIFIED SCHEMATIC, WP008 01.
-  LANDING GEAR CONTROLLED RELAYS SIMPLIFIED SCHEMATIC, A1-F18AC-130-100, WP006 00.
-  INTERNAL FUEL TRANSFER SYSTEM SIMPLIFIED SCHEMATIC, WP014 00.
-  161316 AND UP.
-  F/A-18B.
-  161353 THRU 161528 BEFORE F/A-18 AFC 41.
-  161702 AND UP; ALSO 161353 THRU 161528 AFTER F/A-18 AFC 41.
-  161353 THRU 161761.
-  161716 AND UP.
-  F/A-18A.
-  POWER DISTRIBUTION SIMPLIFIED SCHEMATIC, A1-F18AC-420-100, WP005 00.

Figure 1. Fuel Pressurization and Vent System Simplified Schematic (Sheet 12)



## ORGANIZATIONAL MAINTENANCE

## PRINCIPLES OF OPERATION

## DESCRIPTION AND OPERATION

## FUEL QUANTITY GAGING SYSTEM

## Reference Material

Fuel System .....	A1-F18AC-460-100
Internal Fuel Transfer System Description .....	WP012 00
Internal Fuel Transfer System Simplified Schematic .....	WP014 00
Fuel Quantity Gaging System Component Locator .....	WP021 01
Fuel Quantity Gaging System Simplified Schematic .....	WP022 00
Fuel Quantity Low Level Warning System Description .....	WP023 00
Maintenance Status Display and Recording System .....	A1-F18AC-580-100
Description .....	WP005 00
Fuel System Interface Simplified Schematic .....	WP011 00
Mission Computer System .....	A1-F18AC-741-100
Description - System and Component .....	WP003 00
Operation .....	WP028 00
Multipurpose Display Group .....	A1-F18AC-745-100
Description .....	WP003 00
Communication, TACAN, ADF, Electronic Altimeter and IFF System .....	A1-F18AC-600-100
Intercommunication and Audio System .....	WP014 00

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## Record of Applicable Technical Directives

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 AFC 53	-	Elimination of Tanks 1 and 4 Sneak Circuit, Tank 4 Motive Flow Shutoff Valve, and Raised Inverted Baffle (ECP MDA-F/A-18-00055)	15 Jun 86	-
F/A-18 AFC 39	-	No. 1 Fuel Tank Interconnect Valve Replacement and Fuel Sequencing Modification (ECP MDA-F/A-18-00072C1)	1 Nov 86	-

## 1. DESCRIPTION.

2. **SYSTEM DESCRIPTION.** The fuel quantity gaging system is a capacitance type system which gages each tank individually. The system is automatic and displays total fuel quantity aboard the aircraft using a minimum number of controls and indicators.

3. The system uses digital readouts to display fuel quantities for each fuselage tank, internal wings and external fuel tanks.

4. The system includes a Built-in-test (BIT) function to verify operating conditions of components and indicators.

5. On 161520 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 39 AND 53, the fuel quantity gaging system controls the transfer of fuel from tank 1 with fuel quantities above fuel low level warning (WP012 00).

6. The system is made up of:

a. A fuel quantity indicator (and a repeater indicator on F/A-18B).

b. Sixteen fuel quantity transmitters.

c. An intermediate device.

7. The system requires, no calibration if any of the components are replaced.

8. **COMPONENT DESCRIPTION.** System components shown in WP021 01 and WP022 00 are described and listed below.

9. **FUEL QTY (Fuel Quantity) Indicator.** The FUEL QTY indicator is a 115vac analog digital display indicator which continuously displays internal and external fuel in pounds. The indicator contains an INTR pointer (total internal), TOTAL LBS counter (total internal and external), LEFT and RIGHT counters, and selector switch. The indicator can be used to display individual tank quantities or initiate a built in test of the fuel quantity gaging system.

10. **Fuel Quantity Repeater Indicator - F/A-18B.** The fuel quantity repeater indicator in the rear cockpit continuously displays internal fuel on the INTERNAL LBS counter and internal and external fuel on the TOTAL LBS counter.

11. **Fuel Quantity Transmitters.** The fuel quantity transmitters are tank mounted, capacitance type units which return an electrical signal to the intermediate device representing fuel level inside the tank. Each transmitter has three concentric tubes. The outer tube provides shielding for electromagnetic interference. The inner tubes form the plates of a capacitor.

12. **Intermediate Device.** The intermediate device (ID) is a component located between the fuel tank fuel quantity transmitters (this WP) and the FUEL QTY indicator (this WP). The ID provides the electrical power for system operation and transmitter excitation, processing circuitry, and built in test (BIT) circuitry.

13. On 161520 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 39 AND 53, the ID compares fuel quantities in tanks 1 and 4. At predetermined fuel quantities, the ID stops transfer from tank 1 to control aircraft center of gravity (WP012 00).

14. **RELATED SYSTEMS.** Systems related to the fuel quantity gaging system are listed below.



**15. Maintenance Status Display and Recording System (MSDRS).** The maintenance status display and recording system receives inputs from the fuel system through the signal data converter and recorder. The MSDRS signal data recorder sends data to the mission computer system for processing. If the mission computer system detects a fuel system failure, it sends the applicable maintenance code to the MSDRS signal data recorder which sends it to the nose wheelwell Digital Display Indicator ID-2150/ASM-612 for storage and display (A1-F18AC-580-100, WP005 00).

**16. Mission Computer System.** The mission computer system receives fuel system data from the MSDRS. The mission computer system digital data computer no. 1 processes the data to determine when a fuel system failure or caution condition occurs. If a failure occurs, digital data computer no. 1 sends the applicable maintenance code to the MSDRS for storage and display. If a caution condition occurs, digital data computer no. 1 sends the caution message to the multipurpose display group for display and, if applicable, to the intercommunication and audio system for voice alert. (A1-F18AC-741-100, WP003 00).

**17. Multipurpose Display Group.** If the mission computer system detects a fuel system caution condition, it sends the caution message to the multipurpose display group. The left Digital Display Indicator IP-1317( ) and on F/A-18B, the rear left Digital Display Indicator IP-1318( ) receive and display the caution messages (A1-F18AC-745-100, WP003 00).

**18. Intercommunication and Audio System.** The intercommunication and audio system alerts the pilot via the head set. An audible “bingo” or “fuel low” alerts the pilot when a caution occurs (A1-F18AC-600-100, WP014 00).

**19. SYSTEM CONTROLS AND INDICATORS.** Fuel quantity gaging system controls and indicators are listed below.

**20. MASTER CAUTION Light.** The MASTER CAUTION light is on the LH advisory and threat warning indicator panel. The yellow caution light indicates a fuel system malfunction requiring attention but no immediate action. Fuel system cautions/advisories are displayed on left DDI or caution light indicator panel.

**21. Digital Display Indicator IP-1317( ), IP-1318( ).** BINGO caution display will appear on left Digital Display Indicator IP- 1317( ) in the cockpit and on F/A-18B, left Digital Display Indicator IP-1318( ) in the rear cockpit if fuel amount reaches the BINGO fuel setting.

**22. Fuel Quantity Repeater Indicator - F/A-18B.** The repeater indicator in the rear cockpit continuously displays internal fuel on the INTERNAL LBS counter and internal and external fuel on the TOTAL LBS counter.

**23. FUEL QTY (Fuel Quantity) Indicator.** The FUEL QTY indicator receives signals to be displayed from the intermediate device (this WP). Total internal aircraft fuel is displayed using the pointer. Total internal and external fuel is displayed on the TOTAL LBS counter.

**24.** The FUEL QTY selector switch allows fuel quantities for individual tanks to be displayed on the LEFT and RIGHT counters. Selector switch positions are listed below:

**BIT (Built-in-Test)** - spring loaded position that checks the operating condition of the fuel level gaging system. If system passes BIT, a black ID flag is displayed. If system fails BIT, a yellow ID flag is displayed.

**TRANS** - fuel remaining in tank 1 is displayed on the LEFT counter. Fuel remaining in tank 4 is displayed on the RIGHT counter.

**FEED** - fuel remaining in tank 2 is displayed on the LEFT counter. Fuel remaining in tank 3 is displayed on the RIGHT counter.

**INTR WING** - fuel remaining in left internal wing is displayed on the LEFT counter. Fuel remaining in right internal wing is displayed on the RIGHT counter.

**EXT WING** - Fuel remaining in the left external wing tank is displayed on the LEFT counter. Fuel remaining in the right external wing tank is displayed on the RIGHT counter.

EXT CTR - fuel remaining in the center external tank is displayed on the LEFT counter.

**25. Bingo Set Selector/Bug used to:**

- a. Warn pilot when fuel level has depleted to a predetermined level.
- b. Warn pilot when having reached a certain fuel level during inflight refueling.
- c. To stop fuel dump at levels above fuel low level warning (WP023 00).

26. Turning the set selector moves the bug across the INTR pounds scale. When internal fuel reaches the bug, BINGO is displayed on the LH digital display indicator IP-1317( ), IP-1318( ) and "BINGO" voice alert cautions the pilot about fuel state.

**27. OPERATION.**

**28. COMPONENT OPERATION.**

**29. Fuel Quantity Transmitters.** The three concentric metal tubes of each fuel quantity transmitter are separated by teflon spacers. The outer tube shields against electromagnetic interference. The inner tube becomes excited by an electrical signal from the intermediate device. The signal is transmitted from the inner tube to the middle tube using fuel as the conductor. The middle tube returns the signal to the intermediate device (this WP) for processing.

**30. Intermediate Device.** The intermediate device supplies an electrical signal to each tank mounted fuel quantity transmitter. Signals received from the transmitters are compared to outgoing signals, processed and displayed in the cockpit.

**31.** On 161520 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 39 AND 53, the fuel quantities in tank 1 and 4 are continuously compared by the ID CG control circuit. As fuel levels in tank 1 decrease to predetermined levels, the ID creates a ground for the tank 1 transfer control valve (WP012 00), stopping transfer from tank 1. As fuel in tank 4 depletes to within limits, the ID opens the transfer control valve, allowing tank 1 transfer. This process is repeated until tank 4 empties or if fuel low level warning occurs (WP023 00).

**32. SYSTEM OPERATION.** The FUEL QTY indicator continuously displays internal fuel on the INT pointer, and internal and external fuel on the TOTAL LBS counter. On F/A-18B, the repeater indicator continuously displays internal fuel on the INTERNAL LBS counter and internal and external fuel on the TOTAL LBS counter.

33. The indicator has a FUEL QTY selector which allows monitoring of each individual fuel tank. Setting the FUEL QTY selector to positions below indicates the selected tank(s) as shown.

FUEL QTY Selector Position	Tank(s) Selected	Fuel Tank Capacity Indicator
FEED	No. 2 fuel tank No. 3 fuel tank	LEFT counter RIGHT counter
TRANS	No. 1 fuel tank No. 4 fuel tank	LEFT counter RIGHT counter
INTR WING	Left wing tank Right wing tank	LEFT counter RIGHT counter
EXT WING	Left external tank Right external tank	LEFT counter RIGHT counter
EXT CTR	Center external tank	LEFT counter

34. The intermediate device has a failure system that monitors inputs to the FUEL QTY indicator during BIT or normal operation. A comparator circuit in the intermediate device triggers a yellow ID flag on the indicator if intermediate device outputs exceed a required range.

35. A red OFF flag on FUEL QTY indicator is displayed only when the indicator is not operating. When electrical power is on, OFF flag disappears.

36. The fuel quantity transmitters measure the amount of fuel in each internal and external tank. The fuel readings are then sent to the intermediate device. The intermediate device also sends a latching type signal to the Maintenance Status

Display and Recording System (MSDRS) (A1-F18AC-580-100, WP011 00) when any of the conditions below exists:

- a. No. 3 fuel tank fails to accept fuel.
- b. No. 2 fuel tank fails to accept fuel.
- c. No. 4 fuel tank fails transfer or No. 1 fuel tank fails to accept fuel.
- d. No. 1 fuel tank fails transfer or No. 4 fuel tank fails to accept fuel.

37. Any of the above conditions indicates a fuel transfer system failure. The MSDRS now allows the mission computer system (A1-F18AC-741-100, WP028 00) to command the Digital Display Indicator ID-2150/ASM-612 to display failure codes 945, 946, 947 and 948, respectively (WP014 00).

38. **Built-In Test (BIT).** When the FUEL QTY selector is set to BIT, the operating condition of the fuel quantity gaging and low level warning system is tested.

39. When selecting BIT, the intermediate device simulates signals from the fuel quantity transmitters. The simulated signals drive the FUEL QTY indicator as listed below:

Fuel Tank Capacity Indicator	Quantity
INTR pointer	6000 $\pm$ 200 lb.
TOTAL LBS counter	6000 $\pm$ 200 lb.
LEFT counter	600 $\pm$ 50 lb.
RIGHT counter	600 $\pm$ 50 lb.
TOTAL LBS counter (F/A-18B)	6000 $\pm$ 200 lb.
INTERNAL LBS counter (F/A-18B)	6000 $\pm$ 200 lb.

40. Fuel amount gaging integrity is tested as listed below:

- a. If BIT shows indications other than quantities listed in paragraph 39 and ID flag shows, intermediate device is bad.

b. If the ID flag does not appear and indications are other than quantities listed in paragraph 39, indicator is bad.

c. When selecting BIT the left Digital Display Indicator IP-1317( ), displays the cautions listed below:

FUEL LO  
BINGO  
CG (161520 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 39 AND 53)

If any caution is failed in BIT, a FUEL advisory will appear instead of the applicable cautions (listed above). If the inflight refueling probe is extended when BIT is initiated, the CG caution will remain on after BIT is complete.

41. **BINGO Fuel.** The BINGO is used to caution the pilot about his fuel state. The bingo set selector is used to select bingo fuel quantity. Turning the set selector moves the bug across the INTR pounds scale. When internal fuel quantity reaches the bug, BINGO is displayed on the left Digital Display Indicator IP-1317( ) and the "Bingo" voice alert cautions the pilot about his fuel state. Bingo fuel quantity may also be used to stop fuel dump at any desired level above low level warning (800  $\pm$ 100 pounds in either tank) or to warn when a certain level is reached during inflight refueling.

42. **Fuel Quantity Gaging System Cautions/Codes.** Cautions are displayed on left cockpit DDI IP-1317( ), IP-1318( ) or caution light indicator panel and light the MASTER CAUTION light. Codes are displayed on nose wheelwell DDI ID-2150/ASM-612. Fuel quantity gaging system cautions/codes are explained below.

43. FUEL LO. Caution/voice alert that indicates fuel in either feed tank has decreased to 800  $\pm$ 100 pounds.

44. BINGO. Caution/voice alert that indicates total fuel quantity is below the bingo level set by the pilot. Can be reset by setting a new lower bingo level, if above fuel low level warning (800  $\pm$ 100 pounds in either feed tank).

45. CG - 161520 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 39 AND 53. Caution that indicates fuel distribution in transfer tanks 1 and 4 has caused the aircraft center of gravity to be

further aft than desired as determined by fuel quantity gaging intermediate device.

46. FUEL. Advisory that indicates the BIT for FUEL LO, BINGO or CG has failed. The absence of a caution(s) after BIT indicates test failure and the FUEL advisory will appear instead of applicable caution(s).

47. Code 945. Code that indicates a tank 3 transfer failure. Tank 3 fails to accept fuel.

48. Code 946. Code that indicates a tank 2 transfer failure. Tank 2 fails to accept fuel.

49. Code 947. Code that indicates a tank 4 transfer failure or tank 1 fails to accept fuel.

50. Code 948. Code that indicates a tank 1 transfer failure or tank 4 fails to accept fuel.

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**ORGANIZATIONAL MAINTENANCE**

**PRINCIPLES OF OPERATION**

**COMPONENT LOCATOR**

**FUEL QUANTITY GAGING SYSTEM**

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**Reference Material**

None

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**Record of Applicable Technical Directives**

None

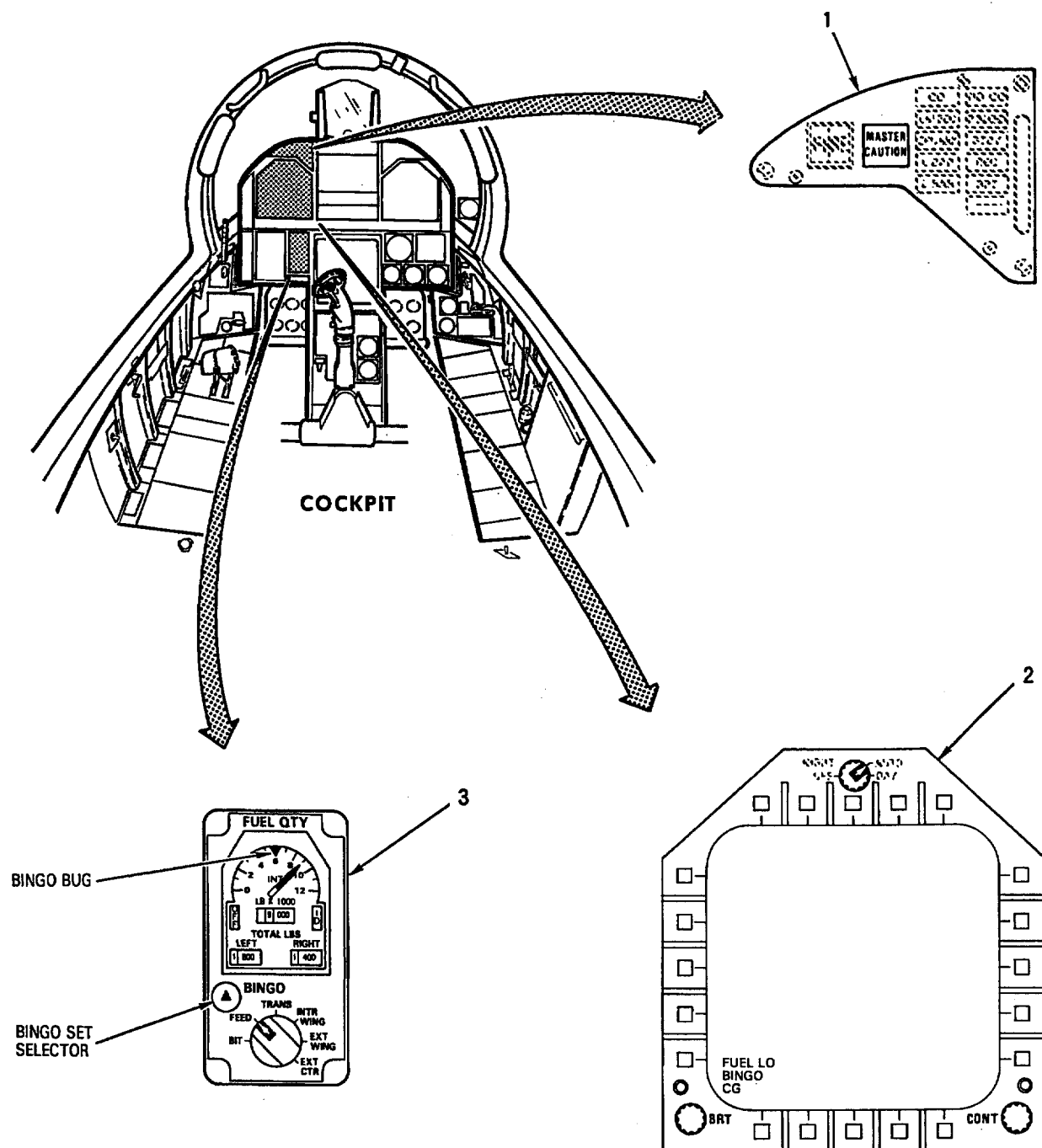


Figure 1. Fuel Quantity Gaging System Component Locator (Sheet 1)

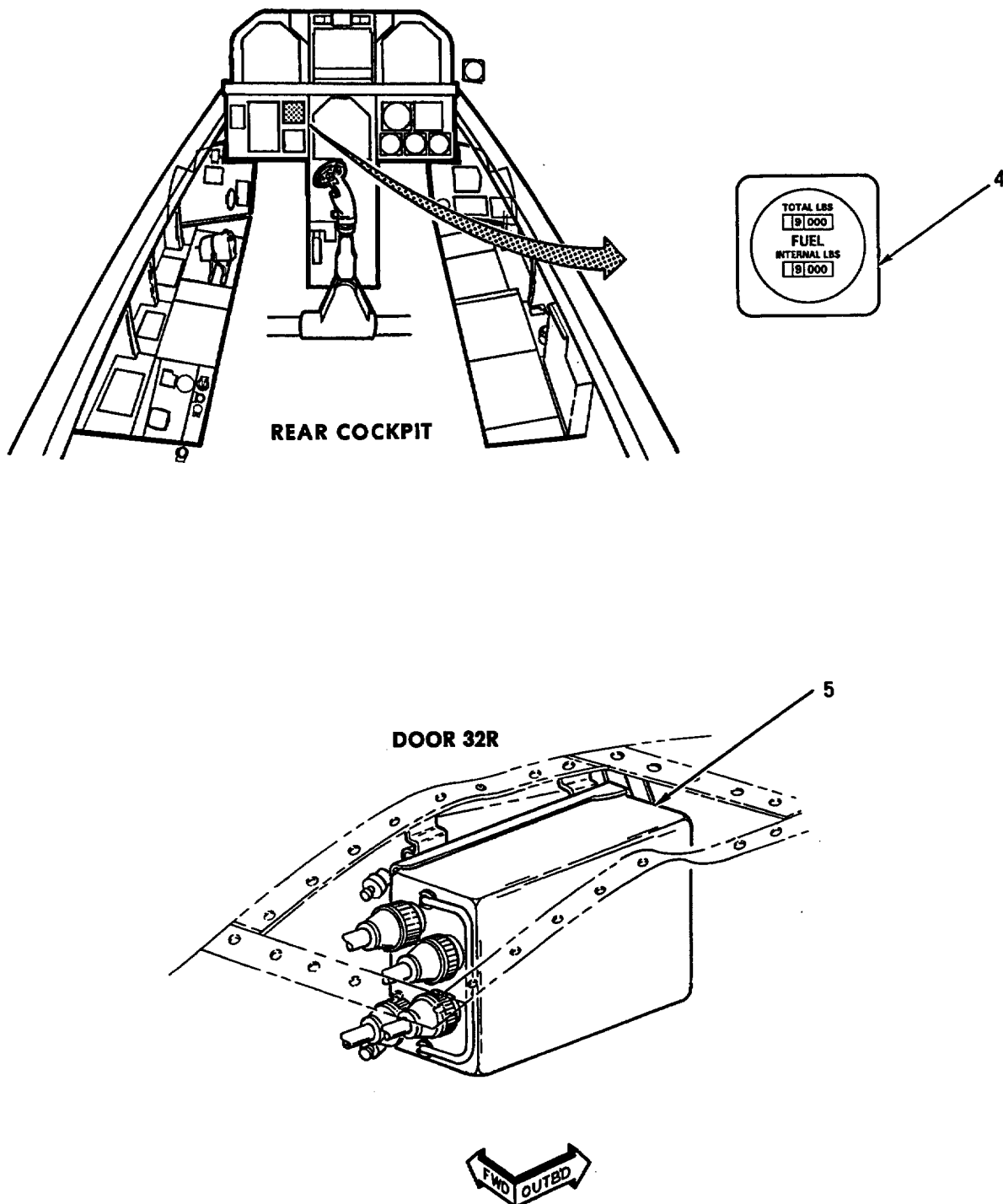


Figure 1. Fuel Quantity Gaging System Component Locator (Sheet 2)

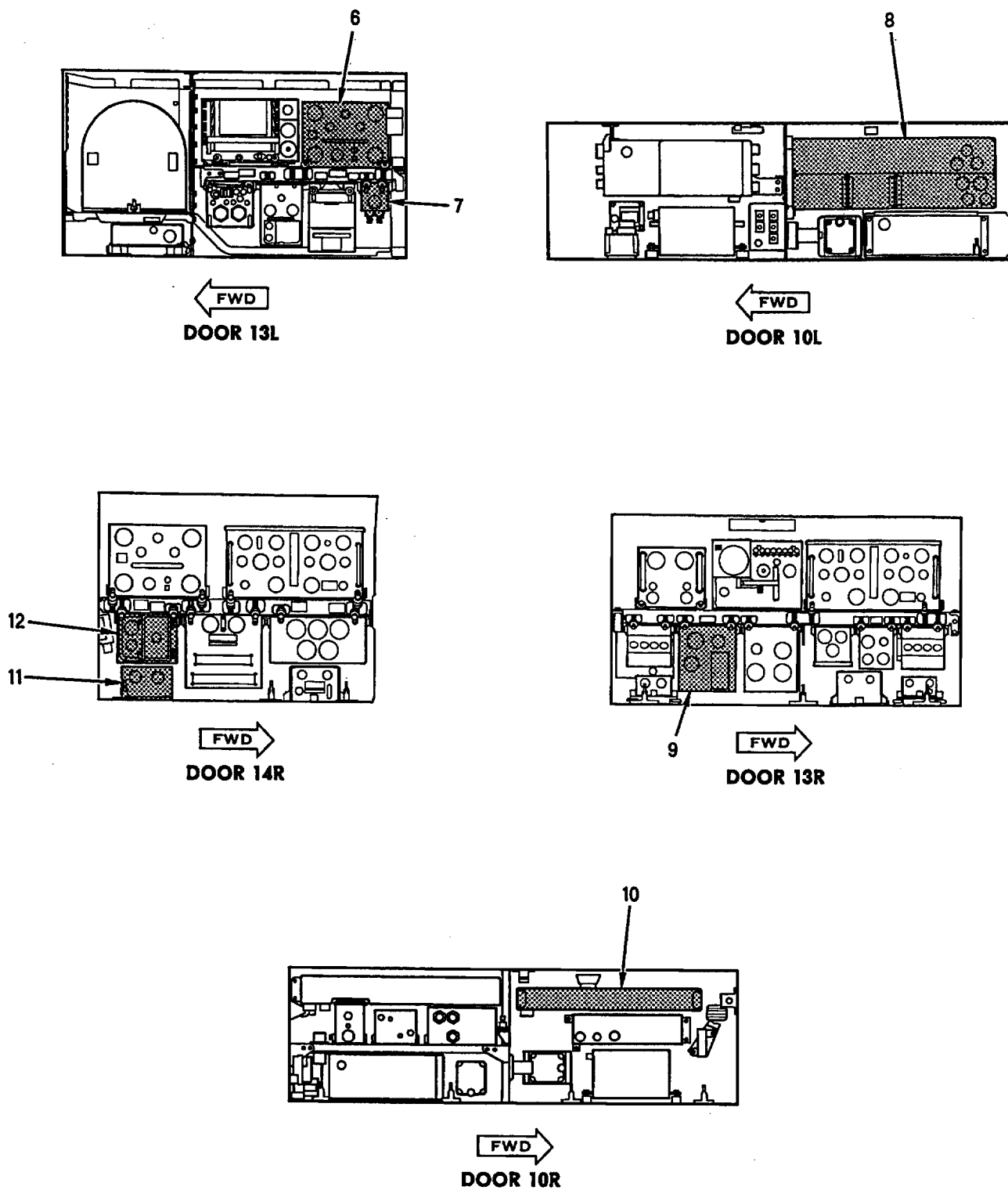
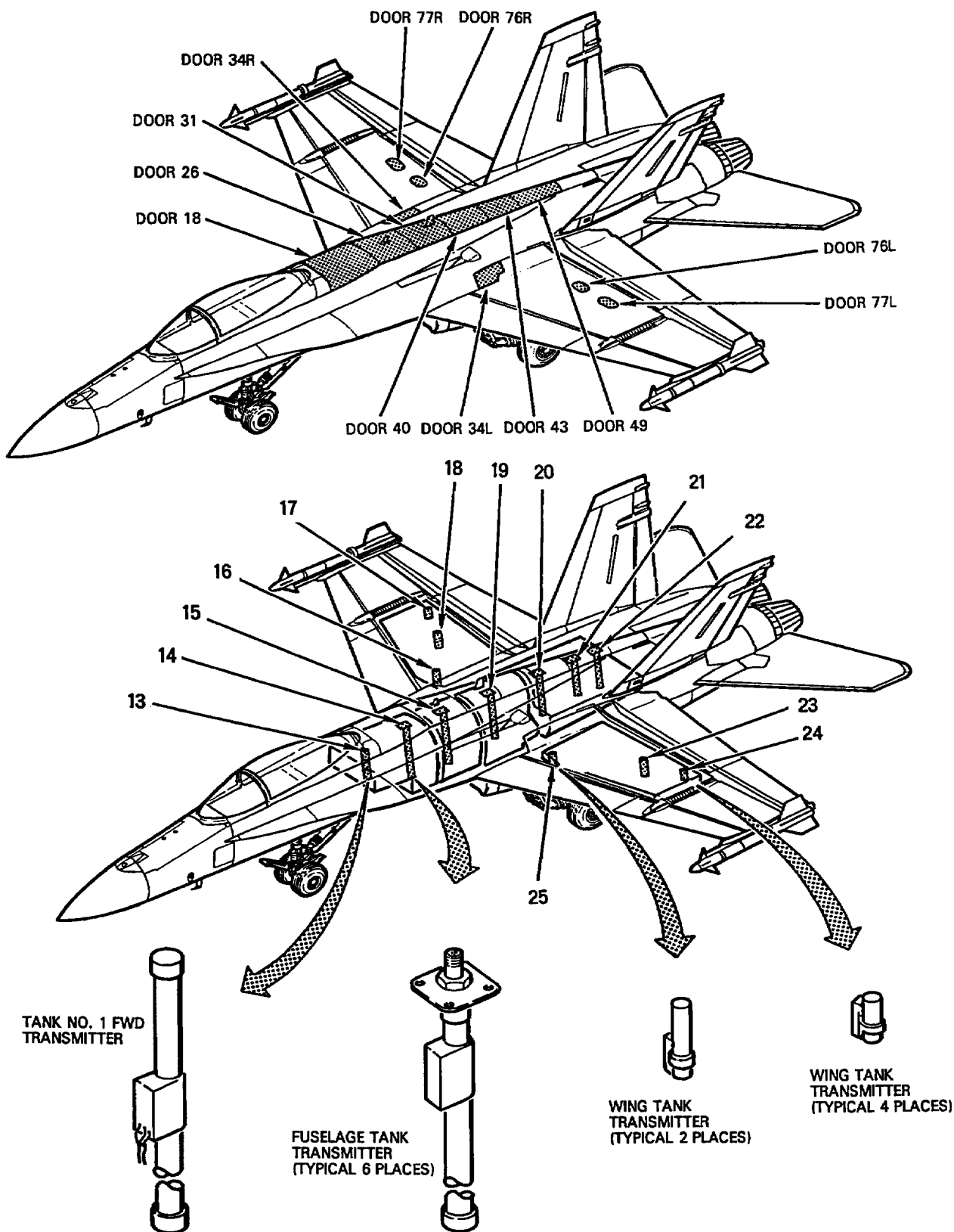


Figure 1. Fuel Quantity Gaging System Component Locator (Sheet 3)





18AC-460-10-(23-4)B

Figure 1. Fuel Quantity Gaging System Component Locator (Sheet 4)

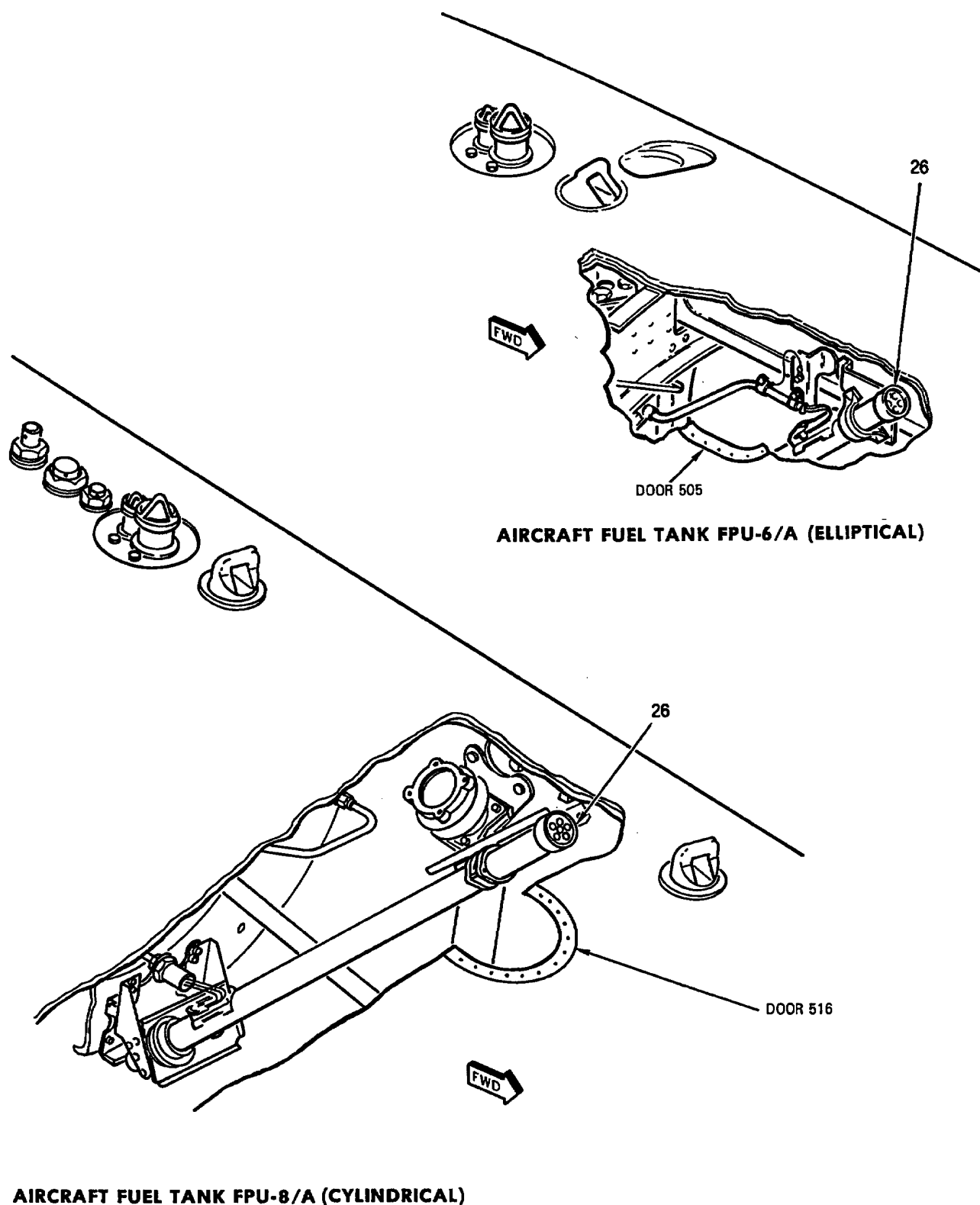


Figure 1. Fuel Quantity Gaging System Component Locator (Sheet 5)

## LEGEND

- 1 161353 THRU 161761.  
 2 161924 AND UP.

Nomenclature	Index No.	Ref Des
CONTROL CONVERTER C-10382/A	9	82A-F001
DIGITAL DATA COMPUTER NO. 1	6	83A-E001
EXTERNAL FUEL TANK FUEL QUANTITY TRANSMITTER	26	5A-Y062
FUEL QUANTITY GAGING INTERMEDIATE DEVICE	11	5A-F014
FUEL QUANTITY REPEATER INDICATOR	4	5A-K015
FUEL QTY INDICATOR	3	5A-H013
LEFT CENTER WING FUEL QUANTITY TRANSMITTER	23	5A-U038
LEFT DIGITAL DISPLAY INDICATOR IP-1317( )	2	80A-H001
LEFT INBOARD WING FUEL QUANTITY TRANSMITTER	25	5A-U039
LEFT OUTBOARD WING FUEL QUANTITY TRANSMITTER	24	5A-U037
LH ADVISORY AND THREAT WARNING INDICATOR PANEL	1	52A-H073
NO. 1 FUEL TANK AFT FUEL QUANTITY TRANSMITTER	14	5A-F029
NO. 1 FUEL TANK FORWARD FUEL QUANTITY TRANSMITTER	13	5A-F028
NO. 2 CIRCUIT BREAKER PANEL ASSEMBLY FUEL QUAN IND CIRCUIT BREAKER	10	52A-D024 5CBD044
NO. 2 FUEL TANK FUEL QUANTITY TRANSMITTER	15	5A-R030
NO. 3 FUEL TANK FUEL QUANTITY TRANSMITTER	19	5A-R031
NO. 3 RELAY PANEL ASSEMBLY 1 BINGO FUEL RELAY	7	52A-E059 5K-E068
NO. 4 FUEL TANK AFT FUEL QUANTITY TRANSMITTER	22	5A-R034
NO. 4 FUEL TANK CENTER FUEL QUANTITY TRANSMITTER	21	5A-R033

Figure 1. Fuel Quantity Gaging System Component Locator (Sheet 6)


Nomenclature	Index No.	Ref Des
NO. 4 FUEL TANK FORWARD FUEL QUANTITY TRANSMITTER	20	5A-R032
NO. 7 CIRCUIT BREAKER RELAY PANEL ASSEMBLY  BINGO FUEL RELAY	8	52A-C057
RIGHT CENTER WING FUEL QUANTITY TRANSMITTER	18	5A-V042
RIGHT INBOARD WING FUEL QUANTITY TRANSMITTER	16	5A-V043
RIGHT OUTBOARD WING FUEL QUANTITY TRANSMITTER	17	5A-V041
SIGNAL DATA CONVERTER CV-3493/ASM-612	5	85A-N022
SIGNAL DATA RECORDER RO-508/ASM-612	12	85A-F001

Figure 1. Fuel Quantity Gaging System Component Locator (Sheet 7)

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**ORGANIZATIONAL MAINTENANCE****PRINCIPLES OF OPERATION****SIMPLIFIED SCHEMATIC****FUEL QUANTITY GAGING SYSTEM**

This work package supersedes WP022 00, dated 1 October 1992.

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**Reference Material**

None

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Fuel Quantity Gaging System Simplified Schematic, Figure 1 ..... 2

**Record of Applicable Technical Directives**

<b>Type/ Number</b>	<b>Date</b>	<b>Title and ECP No.</b>	<b>Date Incorp.</b>	<b>Remarks</b>
F/A-18 AFC 39	-	No. 1 Fuel Tank Interconnect Valve Replacement and Fuel Sequencing Modification (ECP-MDA-F/A-18-00072C1)	1 Nov 86	-

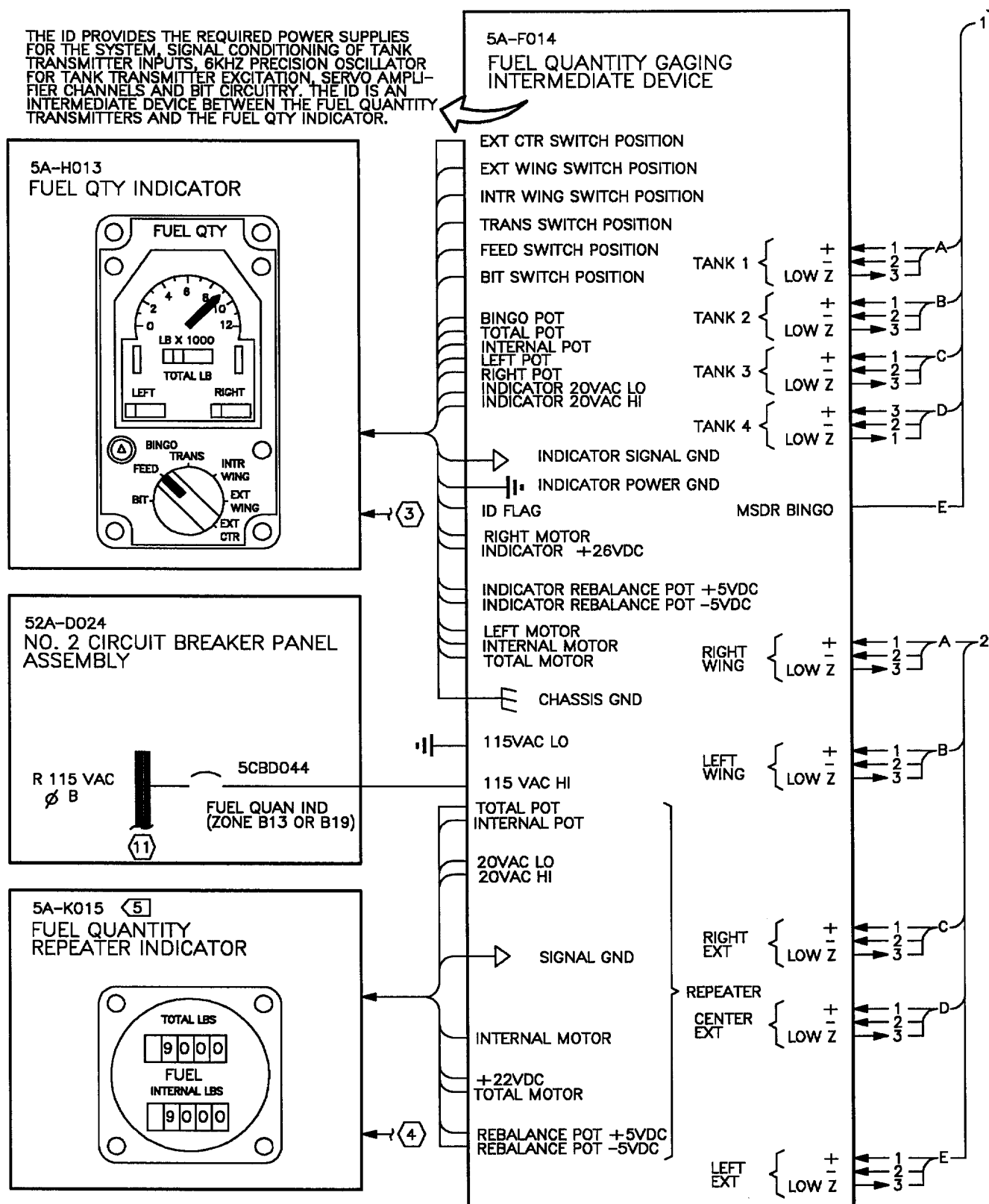
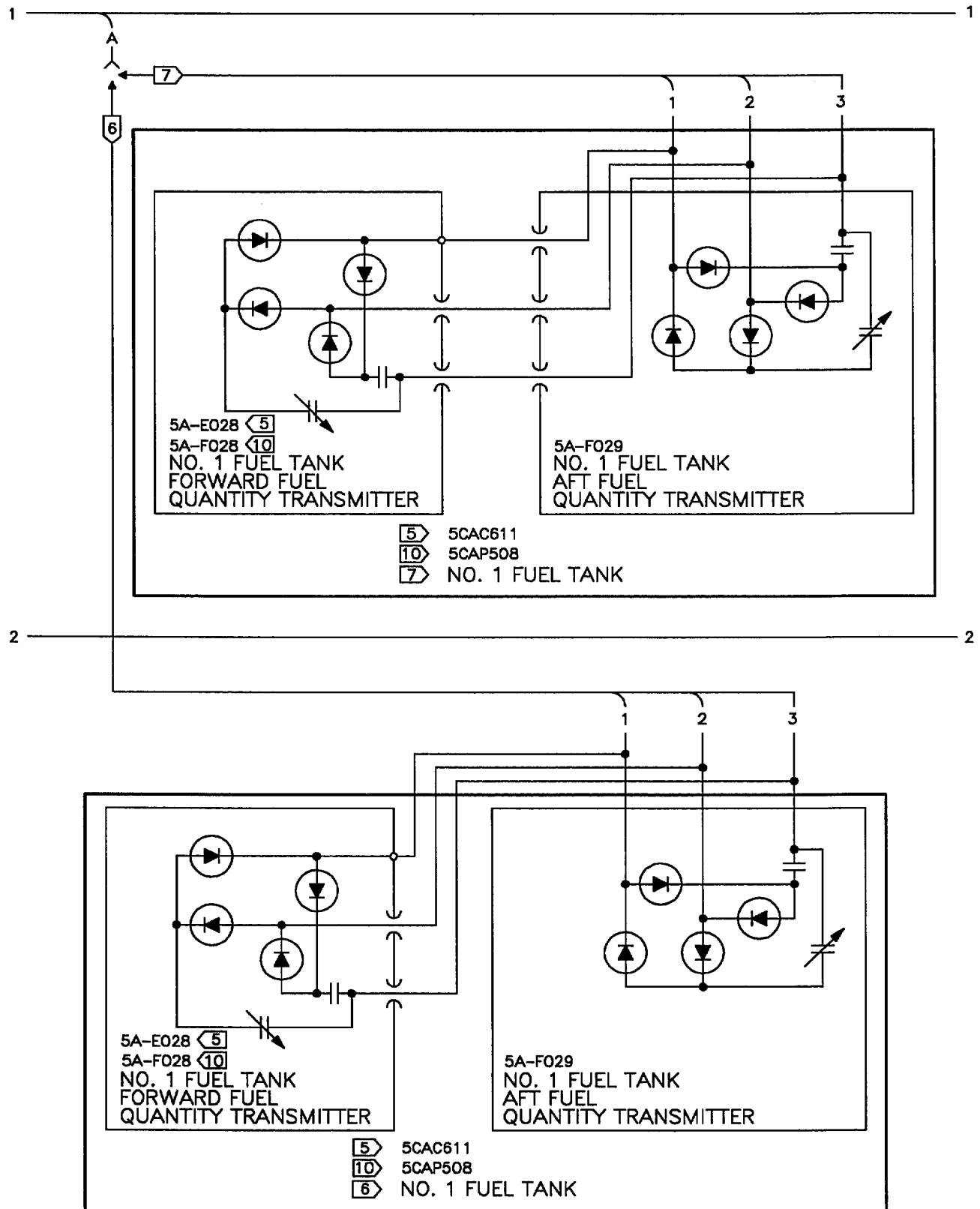
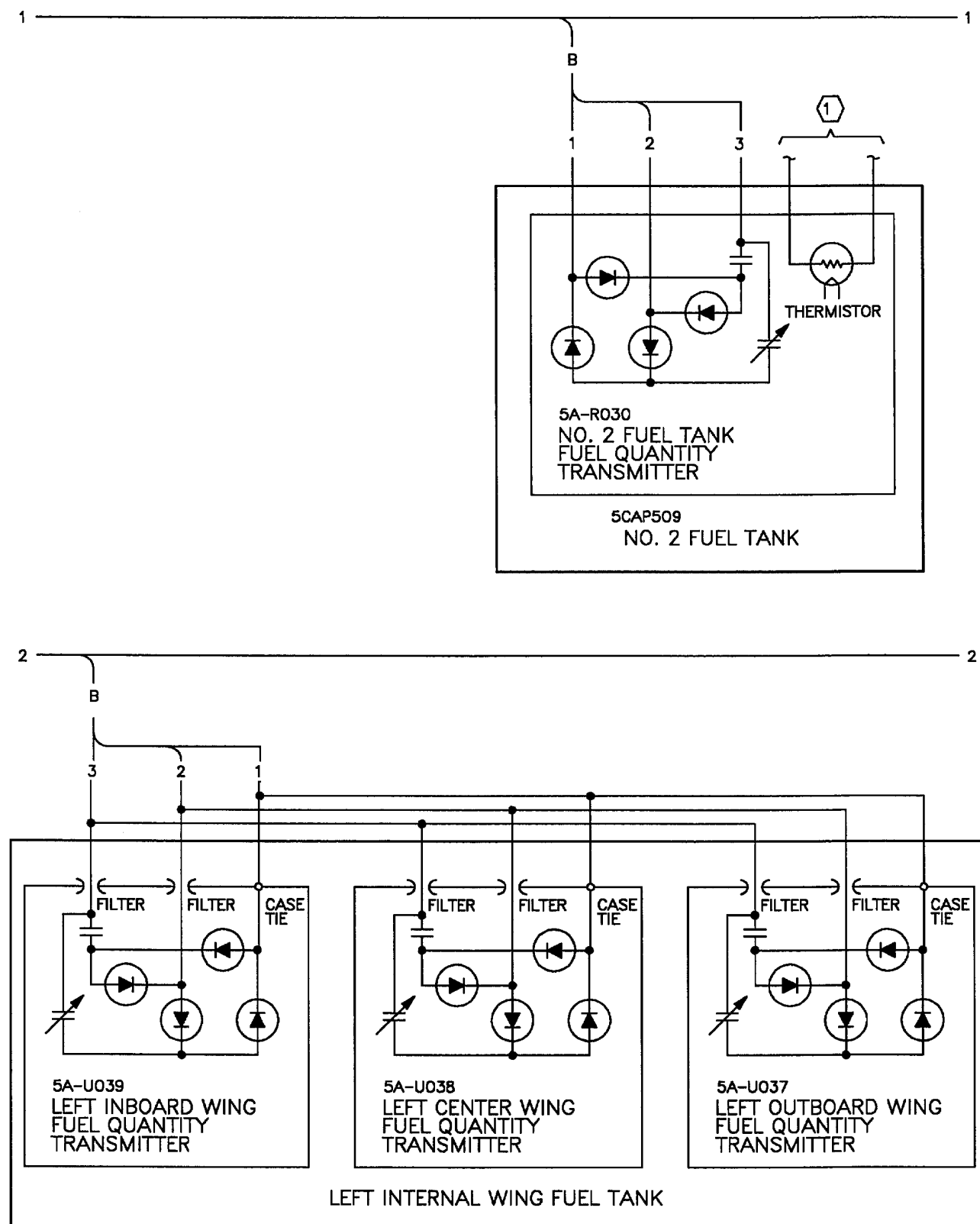


Figure 1. Fuel Quantity Gaging System Simplified Schematic (Sheet 1)



18AC-460-10-(26-2)22-CAT1

Figure 1. Fuel Quantity Gaging System Simplified Schematic (Sheet 2)



18AC-460-10-(26-3)D-CAT1

**Figure 1. Fuel Quantity Gaging System Simplified Schematic (Sheet 3)**



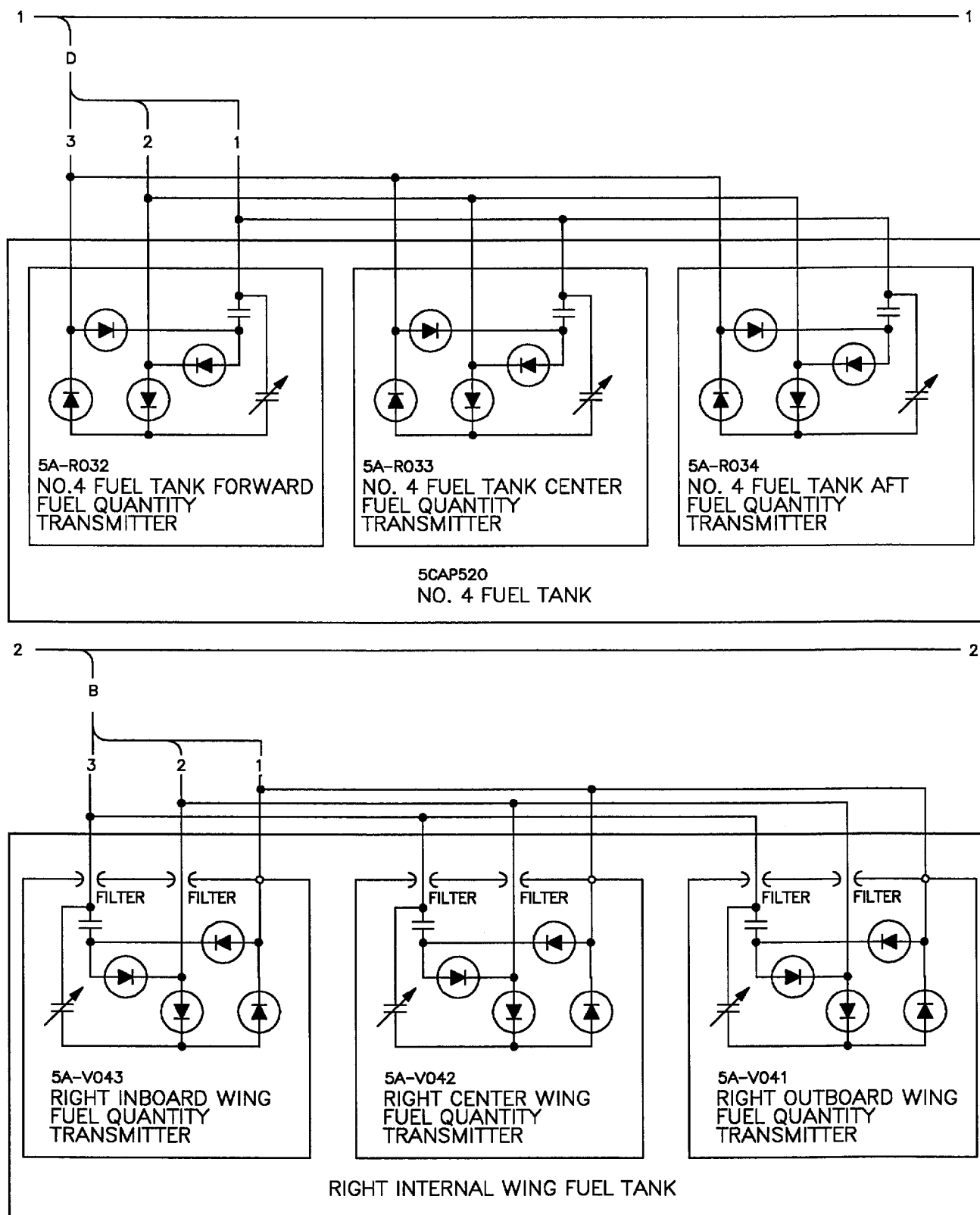


Figure 1. Fuel Quantity Gaging System Simplified Schematic (Sheet 4)

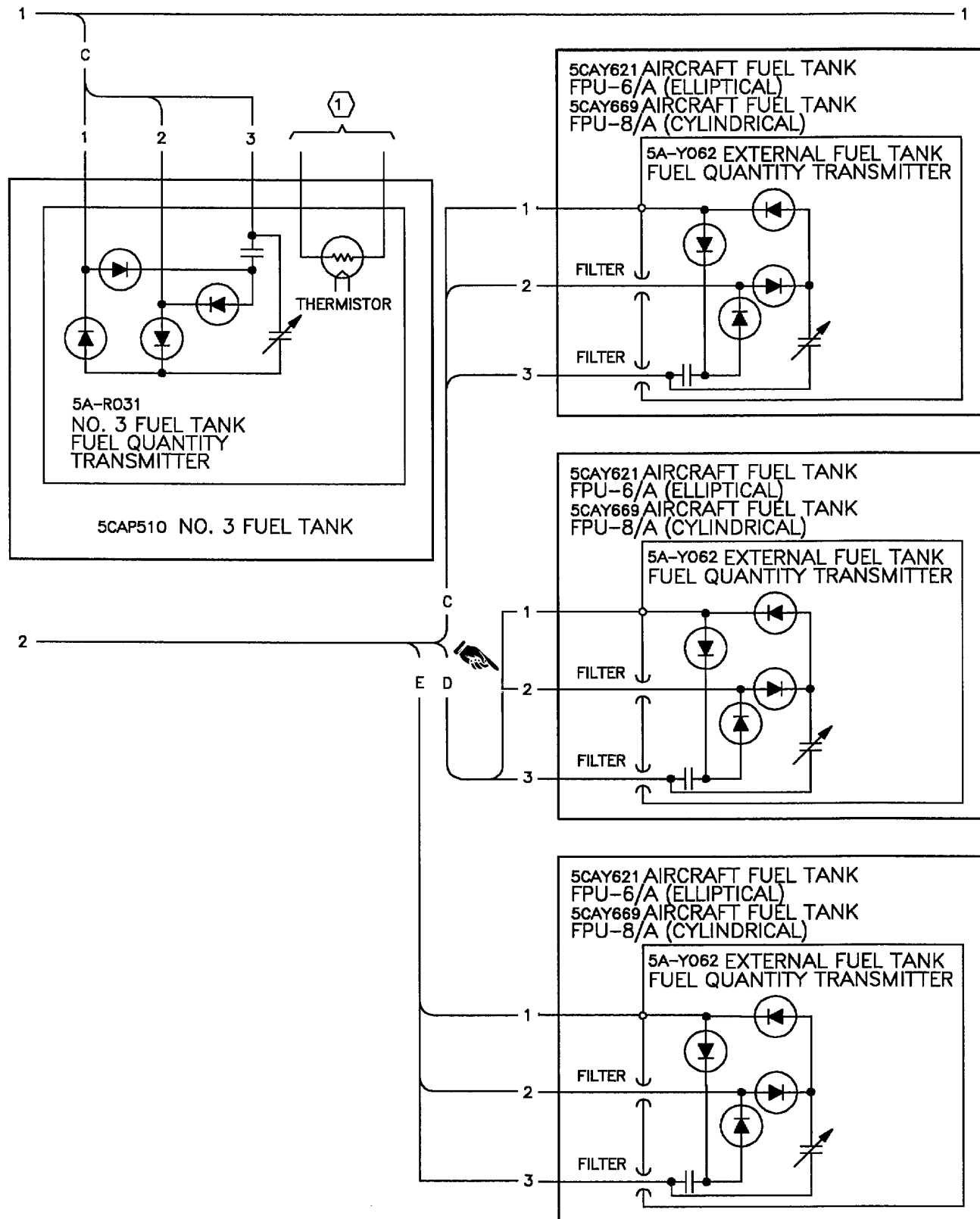


Figure 1. Fuel Quantity Gaging System Simplified Schematic (Sheet 5)

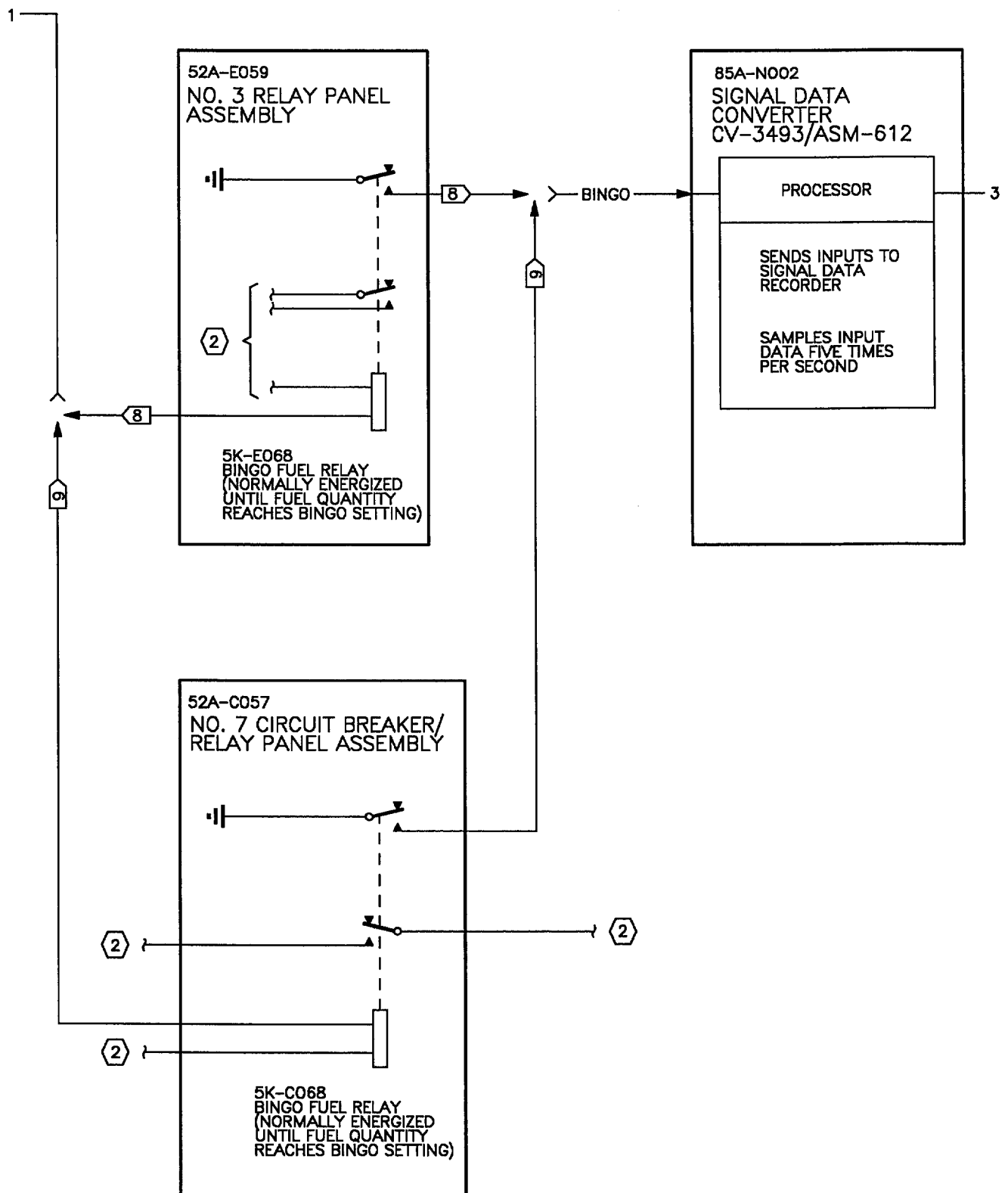
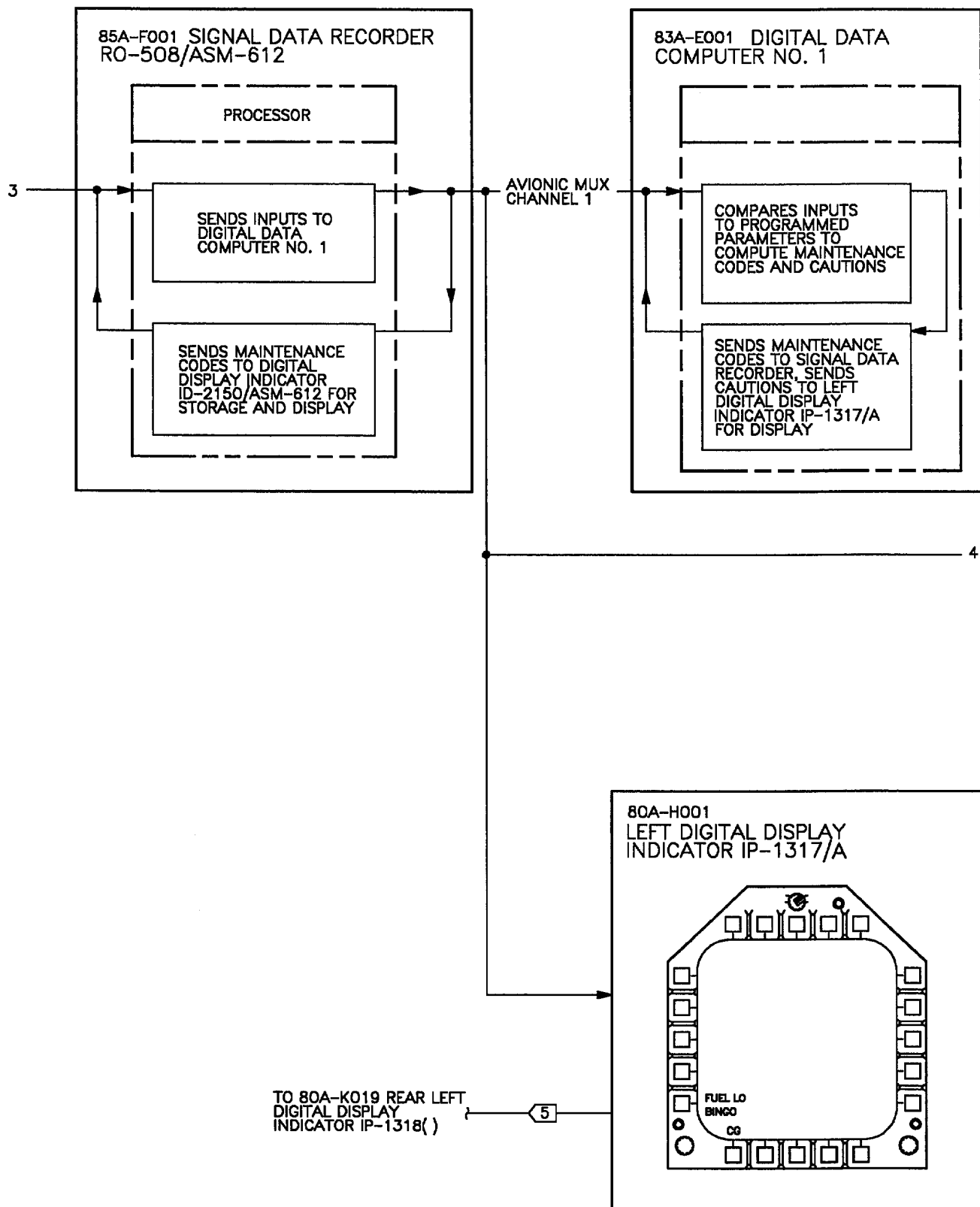
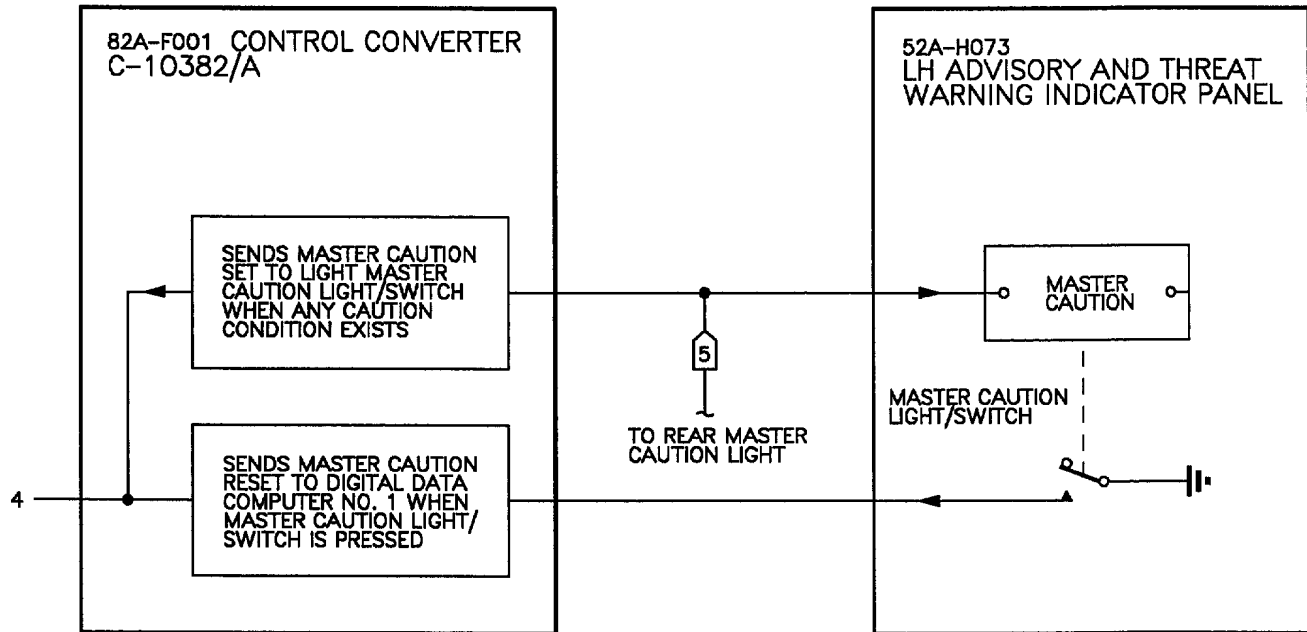


Figure 1. Fuel Quantity Gaging System Simplified Schematic (Sheet 6)



18AC-460-10-(26-7)19-CATI

Figure 1. Fuel Quantity Gaging System Simplified Schematic (Sheet 7)



### LEGEND

- ① FUEL QUANTITY LOW LEVEL WARNING SYSTEM SIMPLIFIED SCHEMATIC, WP023 02
- ② FUEL DUMP SYSTEM SIMPLIFIED SCHEMATIC, WP017 02
- ③ COCKPIT CONSOLE LIGHTS SIMPLIFIED SCHEMATIC, A1-F18AC-440-100, WP004 00
- ④ REAR COCKPIT, CONSOLE LIGHTS SIMPLIFIED SCHEMATIC, A1-F18AC-440-100, WP005 00.
- ⑤ F/A-18B.
- ⑥ 161353 THRU 161519 BEFORE F/A-18 AFC 39.
- ⑦ 161520 AND UP; ALSO 161353 THRU 161519 AFTER F/A-18 AFC 39.
- ⑧ 161353 THRU 161761
- ⑨ 161924 AND UP
- ⑩ F/A-18A
- ⑪ POWER DISTRIBUTION SIMPLIFIED SCHEMATIC, A1-F18AC-420-100, WP005 00.

Figure 1. Fuel Quantity Gaging System Simplified Schematic (Sheet 8)



## ORGANIZATIONAL MAINTENANCE

## PRINCIPLES OF OPERATION

## DESCRIPTION AND OPERATION

## FUEL QUANTITY LOW LEVEL WARNING SYSTEM

## Reference Material

Fuel System .....	A1-F18AC-460-100
Fuel Quantity Gaging System Description and Operation .....	WP021 00
Fuel Quantity Low Level Warning System Component Locator .....	WP023 01
Fuel Quantity Low Level Warning System Simplified Schematic .....	WP023 02
Hot Fuel Recirculation System Description and Operation .....	WP018 00
Maintenance Status Display and Recording System .....	A1-F18AC-580-100
Operation .....	WP005 00
Mission Computer System .....	A1-F18AC-741-100
Description-System Component .....	WP003 00
Multipurpose Display Group .....	A1-F18AC-745-100
Description .....	WP003 00
Communication, TACAN, ADF, Electronic Altimeter, and IFF System .....	A1-F18AC-600-100
Intercommunication and Audio System .....	WP014 00

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## Record of Applicable Technical Directives

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 AFC 39	-	No. 1 Fuel Tank Interconnect Valve Replacement and Fuel Sequencing Modification (ECP-MDA-F/A-18-00072C1)	1 Nov 86	-

## 1. DESCRIPTION.

2. **SYSTEM DESCRIPTION.** The low level warning system warns the pilot when the internal fuel amount depletes below  $800 \pm 100$  LBS in either no. 2 or no. 3 fuel feed tanks.

3. The system is made up of:

- a. A fuel low level sensing control unit.
- b. Two low level warning sensors (thermistors).

4. **COMPONENT DESCRIPTION.** System components shown in WP023 01 and WP023 02 are described and listed below.

5. **Low Level Sensing Control Unit.** The low level sensing control unit monitors voltage across the thermistors mounted on no. 2 and no. 3 fuel tank fuel quantity transmitters. When fuel level depletes below either thermistor, the control unit energizes the fuel low level relay.

6. **No. 1 Fuel Tank Fuel Low Level Shutoff Valve 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39.** The fuel low level shutoff valve is a 28vdc solenoid operated valve mounted in the motive flow line prior to the pressure operated interconnect valve. When energized closed, the shutoff valve opens the pressure operated interconnect valve allowing fuel flow from tank 1 to tank 2.

7. **SYSTEM CONTROLS AND INDICATORS.** The fuel low level warning system controls and indicators are listed below.

8. **MASTER CAUTION Light.** The MASTER CAUTION light is located on the LH advisory and threat warning indicator panel. The yellow caution light indicates a fuel system caution/advisory requiring attention but no immediate action. Fuel system cautions/advisories are displayed on left DDI and caution light indicator panel.

9. **Digital Display Indicators IP-1317( ) and IP-1318( ).** A FUEL LO caution display will appear on left Digital Display Indicator IP-1317( ) in the cockpit and on F/A-18B, left Digital Display Indicator IP-1318( ) in the rear cockpit if fuel amounts deplete below  $800 \pm 100^\circ$  pounds in either no. 2 or no. 3 fuel feed tanks.

10. **FUEL LO Caution Light.** The FUEL LO caution light is located on the caution light indicator panel. This yellow caution light indicates that the fuel amount in fuel feed tanks 2 or 3 has depleted below  $800 \pm 100$  LBS.

11. **RELATED SYSTEMS.** Systems related to the fuel quantity low level warning system are listed below.

12. **Maintenance Status Display and Recording System (MSDRS).** The maintenance status display and recording system receives inputs from the fuel system through the signal data converter and recorder. The MSDRS signal data recorder sends data to the mission computer system for processing. If the mission computer system detects a fuel system failure, it sends the applicable maintenance code to the MSDRS signal data recorder which sends it to the nose wheelwell Digital Display Indicator ID-2150/ASM-612 for storage and display (A1-F18AC-580-100, WP005 00).

13. **Mission Computer System.** The mission computer system receives fuel system data from the MSDRS. The mission computer system digital data computer no. 1 processes the data to determine when a fuel system failure or caution condition occurs. If a failure occurs, digital data computer no. 1 sends the applicable maintenance code to the MSDRS for storage and display. If a caution condition occurs, digital data computer no. 1 sends the caution message to the multipurpose display group for display and, if applicable, to the intercommunication and audio system for voice alert. (A1-F18AC-741-100, WP003 00).

14. **Multipurpose Display Group.** If the mission computer system detects a fuel system caution condition, it sends the caution message to the multipurpose display group. The left Digital Display Indicator IP-1317( ) and on F/A-18B, the rear left Digital Display Indicator IP-1318( ) receive and display the caution messages (A1-F18AC-745-100, WP003 00).

15. **Intercommunication and Audio System.** The intercommunication and audio system alert the pilot via the head set. An audible "bingo" or "fuel low" alerts the pilot when a caution occurs. (A1-F18AC-600-100, WP014 00). The voice alert message is not repeated unless the requirement for the voice alert is gone for 5 or more seconds, and the caution condition reoccurs.



16. **OPERATION.**

17. **SYSTEM OPERATION.** The thermistors are mounted on the fuel quantity transmitters in fuel feed tanks 2 and 3. The thermistor detects a rise in temperature when fuel level depletes to the fuel low level warning point of  $800 \pm 100$  pounds in either feed tank. The fuel low level sensing control unit monitors the thermistors. When fuel low occurs, the fuel low level relays and fuel low level time delay relay are energized and the following occurs:

a. FUEL LO caution appears on caution light indicator panel and on the left digital display indicator. The MASTER CAUTION light on LH advisory and threat warning indicator panel also comes on.

b. Dump valve is closed.

c. Fuel diverter valves are deenergized to direct hot fuel recirculation system fuel to the feed tanks (WP018 00).

d. If the EXT TANKS WING/CTR switch on the FUEL system control panel is set to STOP, the external fuel tank refuel/transfer shutoff valve (WP009 00) is deenergized open (allowing transfer of fuel from the external tanks).

18. On 161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39, the low level shutoff in tank 1 is energized closed when the thermistor in tank 2 detects low fuel. The closed low level shutoff valve stops motive flow fuel to the interconnect valve causing the flapper to swing open. Once the flapper is open, fuel in tank 1 can gravity feed to tank 2.

19. **Built-In Test (BIT).** When the FUEL QTY selector is set to BIT, a paralleled resistance at the low level sensing control unit simulates low fuel to test the operating condition of the fuel low level warning and fuel quantity gaging systems (WP021 00).

20. When BIT simulates low fuel levels, the left Digital Display Indicator IP-1317( ) displays FUEL LO if both fuel quantity gaging and low level warning systems are good. If FUEL LO caution is failed in BIT, a FUEL advisory will appear instead of the FUEL LO caution.

21. Low level warning system integrity is good if conditions listed below appear when FUEL QTY selector is set to BIT.

Indication	Panel or Indicator
------------	--------------------

**NOTE**

BINGO and, if applicable, CG will also be displayed on left DDI IP-1317( ), IP-1318( ) (WP021 00).

FUEL LO	Left Digital Display Indicator IP-1317( ), IP-1318( )
FUEL LO	Caution Light Indicator Panel
MASTER CAUTION	LH Advisory and Threat Warning Indicator Panel

22. **Fuel Quantity Low Level Warning System Cautions.** Cautions are displayed on left cockpit DDI IP-1317( ), IP-1318( ) or caution light indicator panel and light the MASTER CAUTION light. Fuel quantity low level warning system cautions are explained below.

23. FUEL LO. Caution/voice alert that indicates fuel in either feed tank has decreased to  $800 \pm 100$  pounds.

24. FUEL. Advisory that indicates the BIT for FUEL LO, BINGO or CG has failed. The absence of a caution after BIT indicates test failure and the FUEL advisory will appear instead of applicable caution.



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**ORGANIZATIONAL MAINTENANCE**  
**PRINCIPLES OF OPERATION**  
**COMPONENT LOCATOR**  
**FUEL QUANTITY LOW LEVEL WARNING SYSTEM**

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**Reference Material**

None

**Alphabetical Index**

**Subject**

**Page No.**

Fuel Low Level Warning System Component Locator, Figure 1 ..... 2

**Record of Applicable Technical Directives**

Type/ Number	Date	Title and ECP No.	Date Incorp.	Remarks
F/A-18 AFC 53	-	Elimination of Tanks 1 and 4 Sneak Circuit, Tank 4 Motive Flow Shutoff Valve, and Raised Inverted Baffle (ECP-MDA-F/A-18- 00055/C1)	15 Jun 86	-
F/A-18 AFC 39	-	No. 1 Fuel Tank Interconnect Valve Replace- ment and Fuel Sequencing Modification (ECP- MDA-F/A-18-00072C1)	1 Nov 86	-
F/A-18 AFC 48	-	Alternating Current Bus Isolation, (ECP-MDA- F/A-18-00121)	1 Nov 86	-

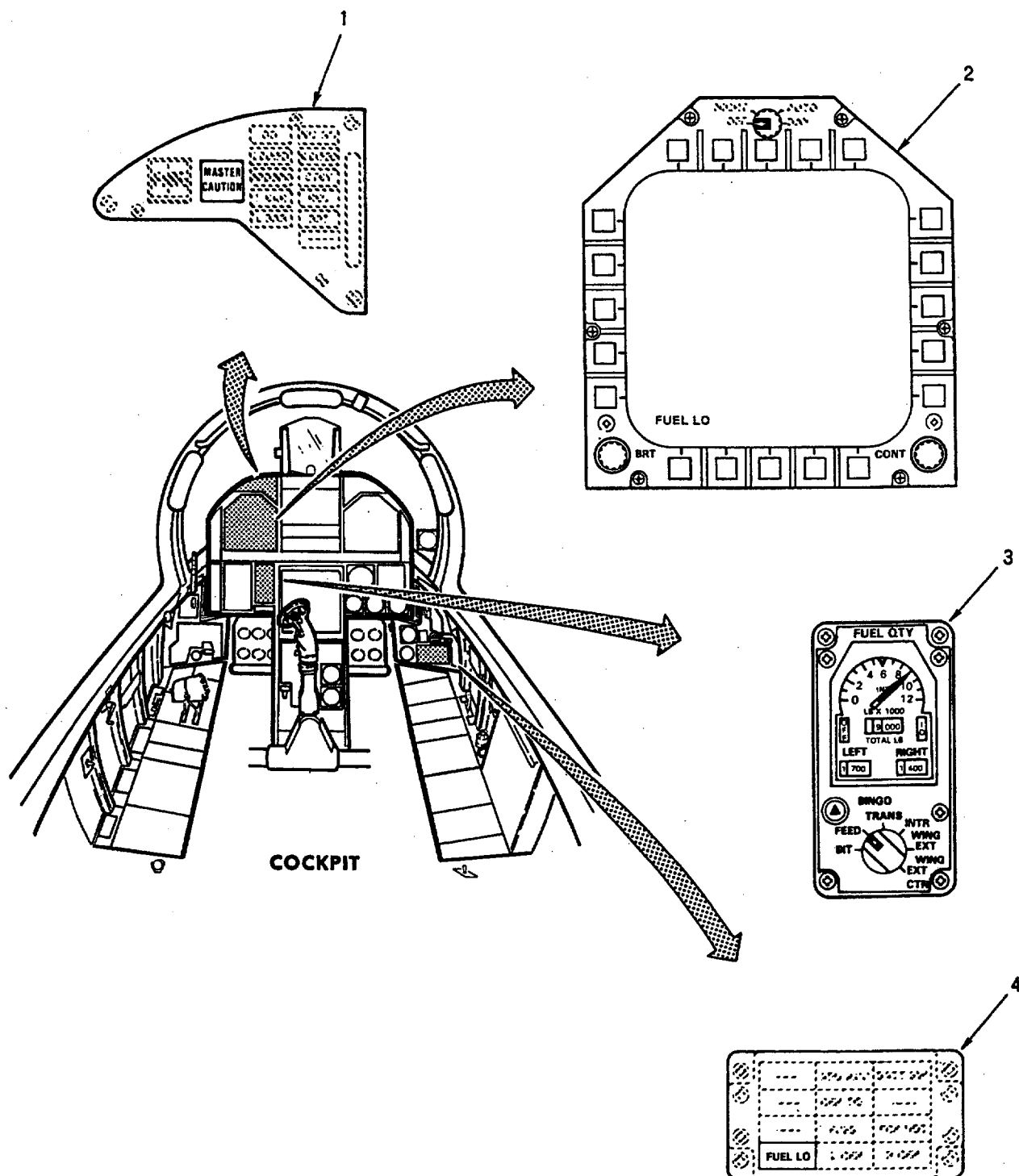


Figure 1. Fuel Low Level Warning System Component Locator (Sheet 1)

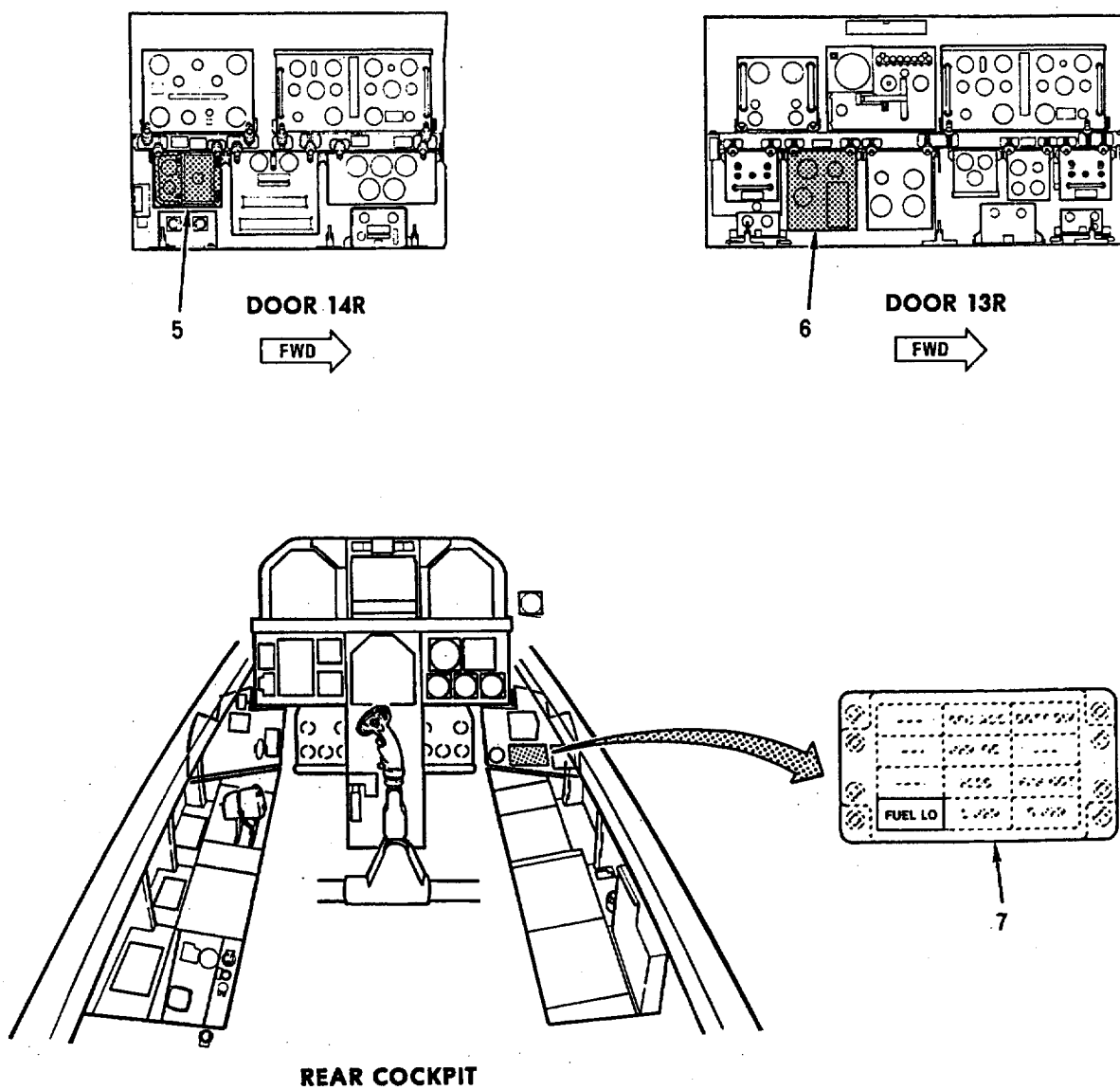
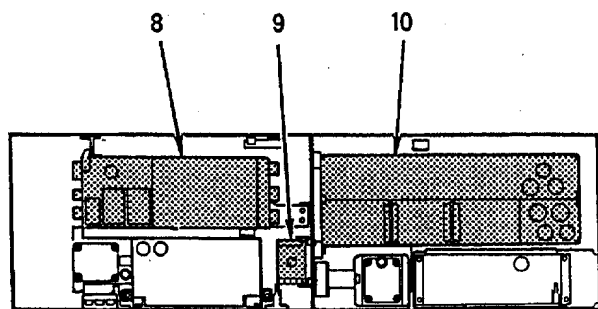
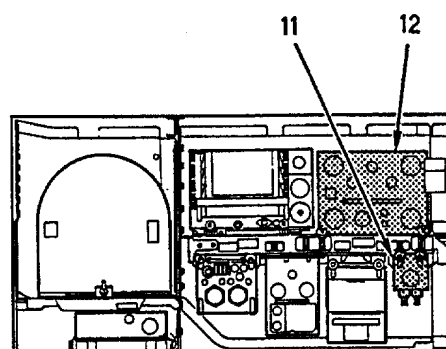


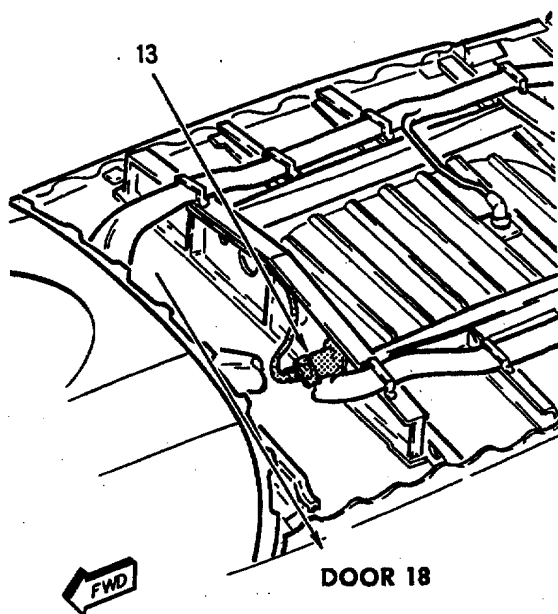
Figure 1. Fuel Low Level Warning System Component Locator (Sheet 2)



DOOR 10L



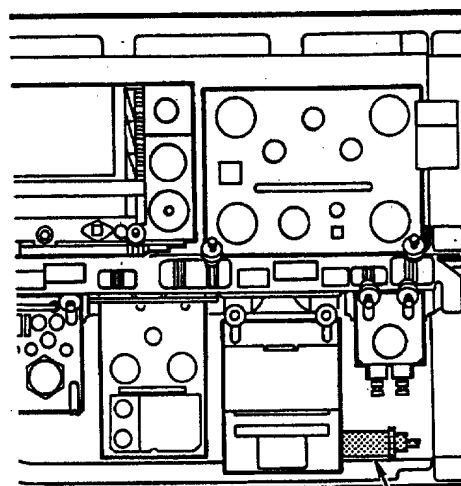
DOOR 13L



DOOR 18



F/A-18A

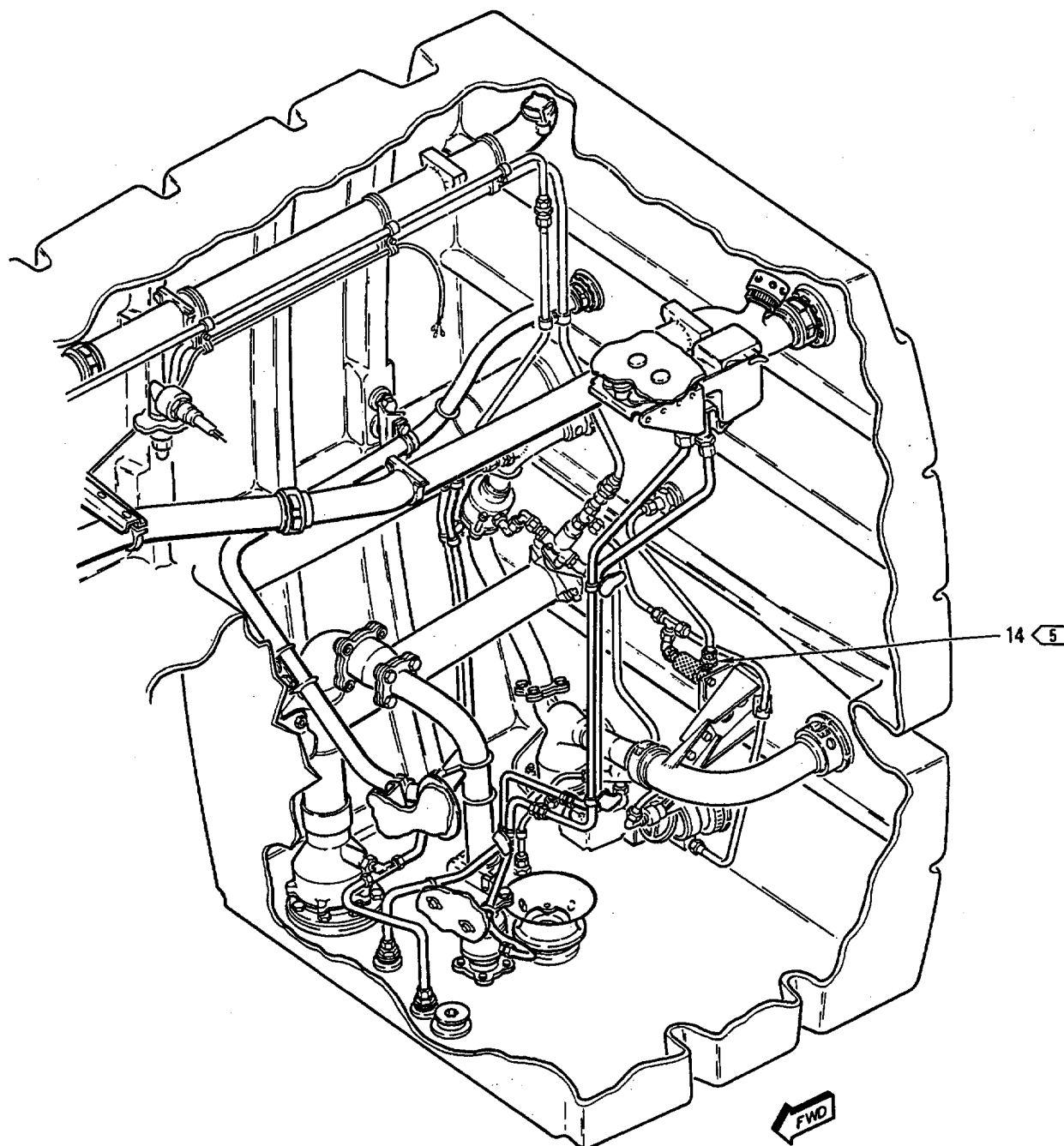


DOOR 13L



F/A-18B

Figure 1. Fuel Low Level Warning System Component Locator (Sheet 3)

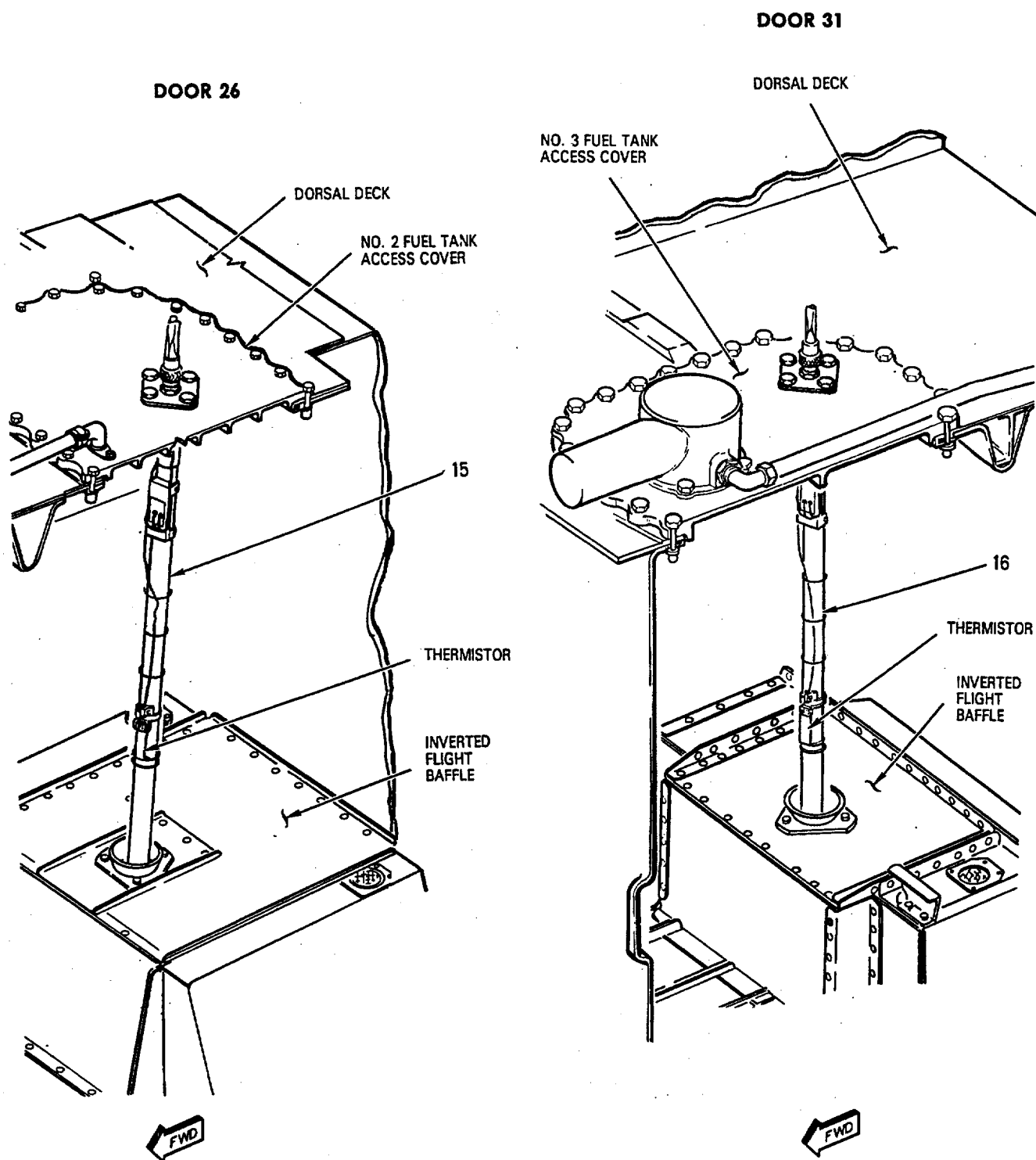


**A**  
**NO. 1 FUEL TANK**

F/A-18A SHOWN, F/A-18B SIMILAR

Figure 1. Fuel Low Level Warning System Component Locator (Sheet 4)

18AC-460-10-(9-4)H









18AC-460-10-(9-5)19

Figure 1. Fuel Low Level Warning System Component Locator (Sheet 5)



## LEGEND

	161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39 AND 53.
	161924 THRU 161987; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39 AND 53 BEFORE F/A-18 AFC 48.
	162394 AND UP; 161353 THRU 161761 AFTER F/A-18 AFC 48.
	161353 THRU 161987 BEFORE F/A-18 AFC 48.
	161924 AND UP; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39.
	161924 THRU 162477; ALSO 161353 THRU 161761 AFTER F/A-18 AFC 39.








Nomenclature	Index No.	Ref Des
CAUTION LIGHT INDICATOR PANEL	4	8A-J042
CONTROL CONVERTER C-10382/A	6	82A-F001
DIGITAL DATA COMPUTER NO. 1	12	83A-E001
FUEL LOW LEVEL SENSING CONTROL UNIT	13	5A-E053
FUEL QTY INDICATOR	3	5A-H013
LEFT DIGITAL DISPLAY INDICATOR IP-1317()	2	85A-H001
LH ADVISORY AND THREAT WARNING INDICATOR PANEL	1	52A-H073
 NO. 1 FUEL TANK FUEL LOW LEVEL SHUTOFF VALVE	14	5L-E171
NO. 2 FUEL TANK FUEL QUANTITY TRANSMITTER	15	5A-R030
NO. 3 FUEL TANK FUEL QUANTITY TRANSMITTER	16	5A-R031
NO. 3 RELAY PANEL ASSEMBLY	11	52A-E059
FUEL LOW LEVEL BIT RELAY NO. 1		5K-E055
 FUEL LOW LEVEL BIT RELAY NO. 2		5K-E164
 FUEL LOW LEVEL BIT RELAY NO. 3		5K-E165
NO. 7 CIRCUIT BREAKER/RELAY PANEL ASSEMBLY	10	52A-C057
 FUEL LOW LEVEL RELAY NO. 1		5K-C163
 FUEL LOW LEVEL TIME DELAY RELAY		5K-C147
NO. 8 CIRCUIT BREAKER/RELAY PANEL ASSEMBLY	8	52A-C159
FUEL LOW LEVEL RELAY NO. 2		5K-C052
 FUEL LOW LEVEL RELAY NO. 3		5K-C170
FUEL LOW LVL WRN CIRCUIT BREAKER		5CBC050
LIQ LVL CONT CIRCUIT BREAKER		5CBC054
 NO. 9 RELAY PANEL ASSEMBLY	9	52A-C161
FUEL LOW LEVEL RELAY NO. 1		5K-C163
FUEL LOW LEVEL TIME DELAY RELAY		5K-C147

Figure 1. Fuel Low Level Warning System Component Locator (Sheet 6)

Nomenclature	Index No.	Ref Des
REAR CAUTION LIGHT INDICATOR PANEL	7	8A-L127
SIGNAL DATA RECORDER RO-508/ASM-612	5	85A-F001

**Figure 1. Fuel Low Level Warning System Component Locator (Sheet 7)**

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**ORGANIZATIONAL MAINTENANCE**  
**PRINCIPLES OF OPERATION**  
**SIMPLIFIED SCHEMATIC**  
**FUEL QUANTITY LOW LEVEL WARNING SYSTEM**

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**Reference Material**

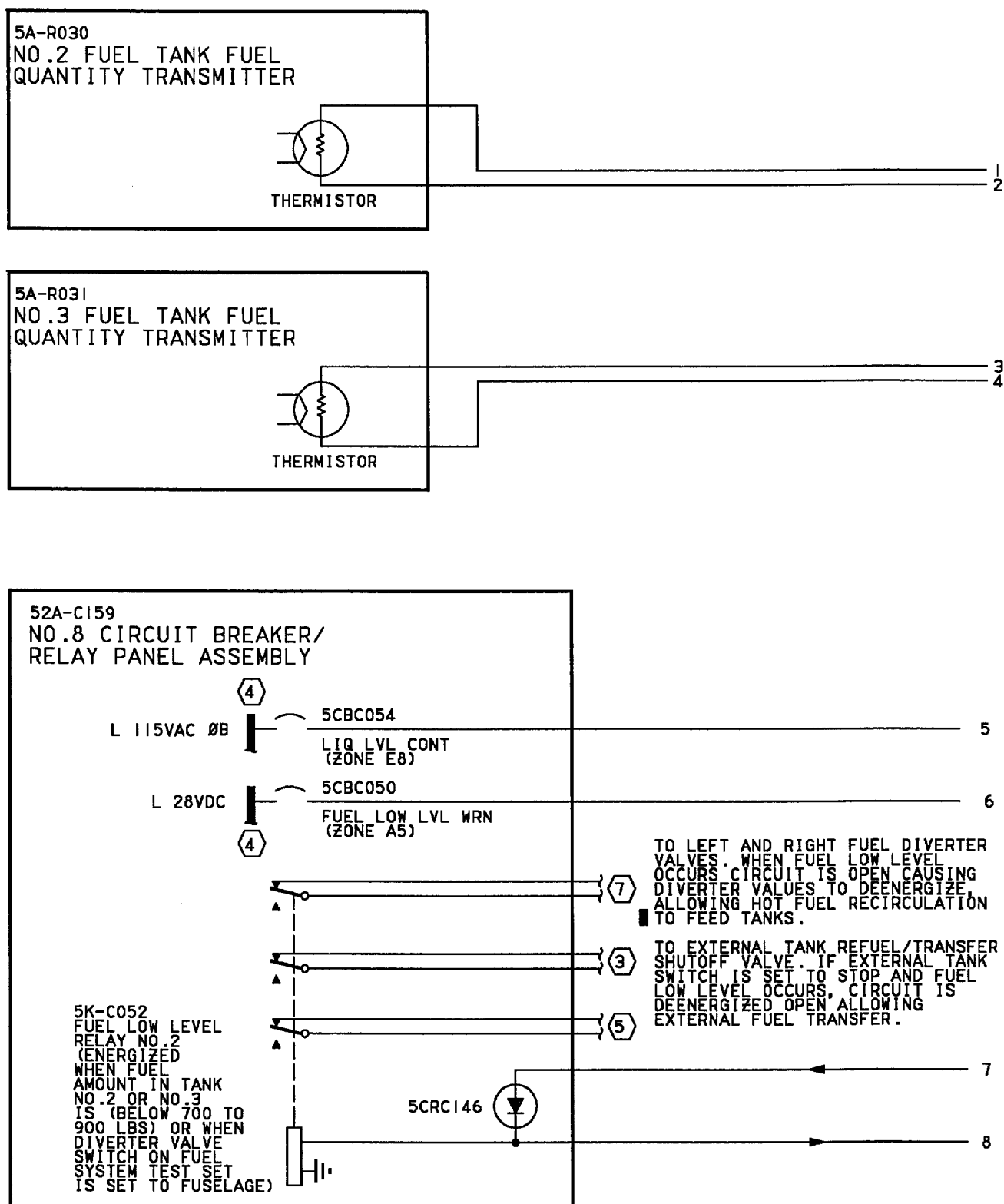
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<b>Subject</b>	<b>Page No.</b>
Fuel Quantity Low Level Warning System Simplified Schematic - 161353 THRU 161761 BEFORE F/A-18AFC 39 AND 53, Figure 1 .....	2
Fuel Quantity Low Level Warning System Simplified Schematic - 161924 AND UP, Figure 2 .....	8
Fuel Quantity Low Level Warning System Simplified Schematic - 161353 THRU 161761 AFTER F/A-18 AFC 39 and 53, Figure 3 .....	14

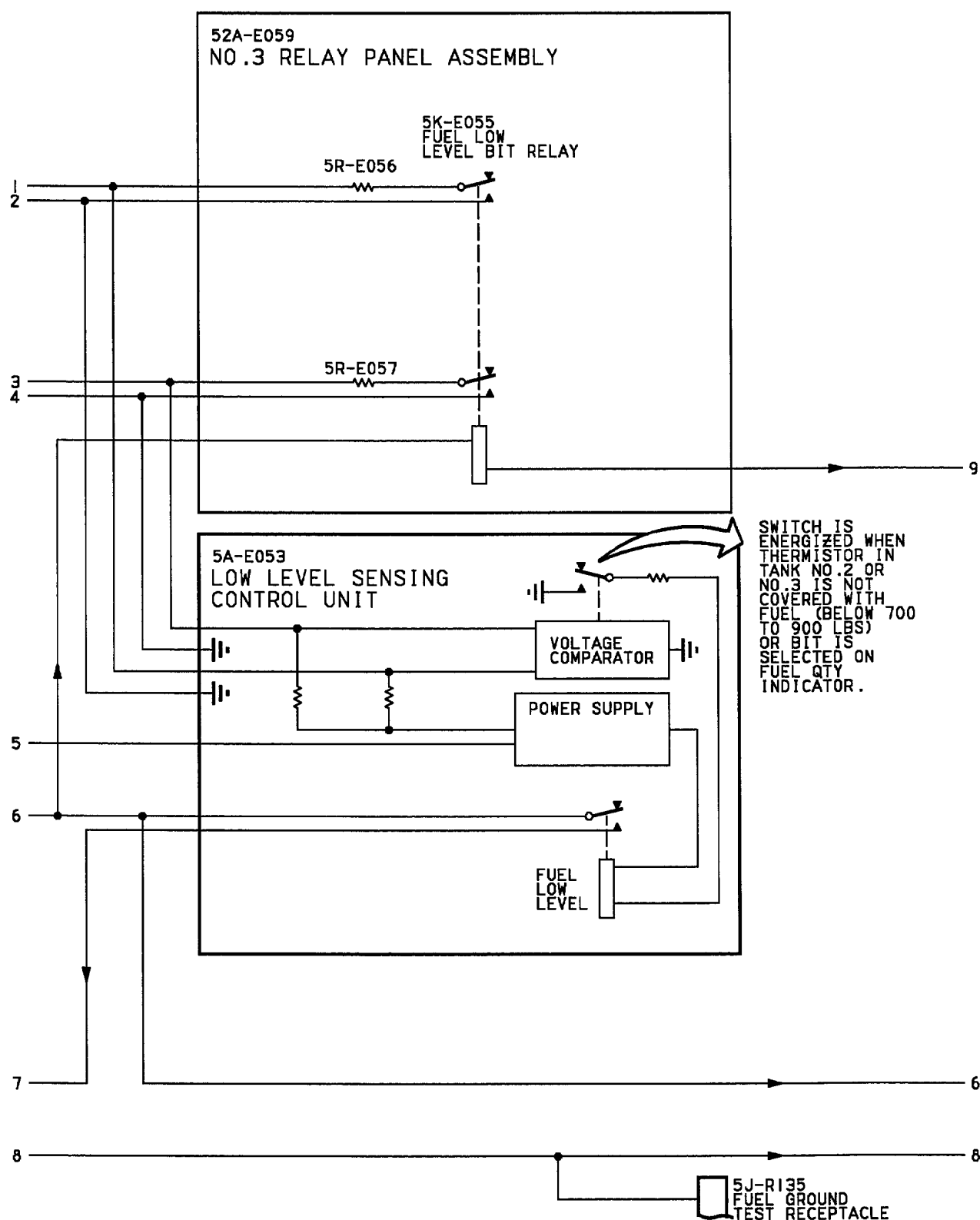
**Record of Applicable Technical Directives**

<b>Type/ Number</b>	<b>Date</b>	<b>Title and ECP No.</b>	<b>Date Incorp.</b>	<b>Remarks</b>
F/A-18 AFC 53	-	Elimination of Tanks 1 and 4 Sneak Circuit, Tank 4 Motive Flow Shutoff Valve, and Raised Inverted Baffle (ECP-MDA-F/A-18-00055/C1)	15 Jun 86	-
F/A-18 AFC 39	-	No. 1 Fuel Tank Interconnect Valve Replace- ment and Fuel Sequencing Modification (ECP- MDA-F/A-18-00072C1)	1 Nov 86	-
F/A-18 AFC 48	-	Alternating Current Bus Isolation, (ECP-MDA- F/A-18-00121)	1 Nov 86	-



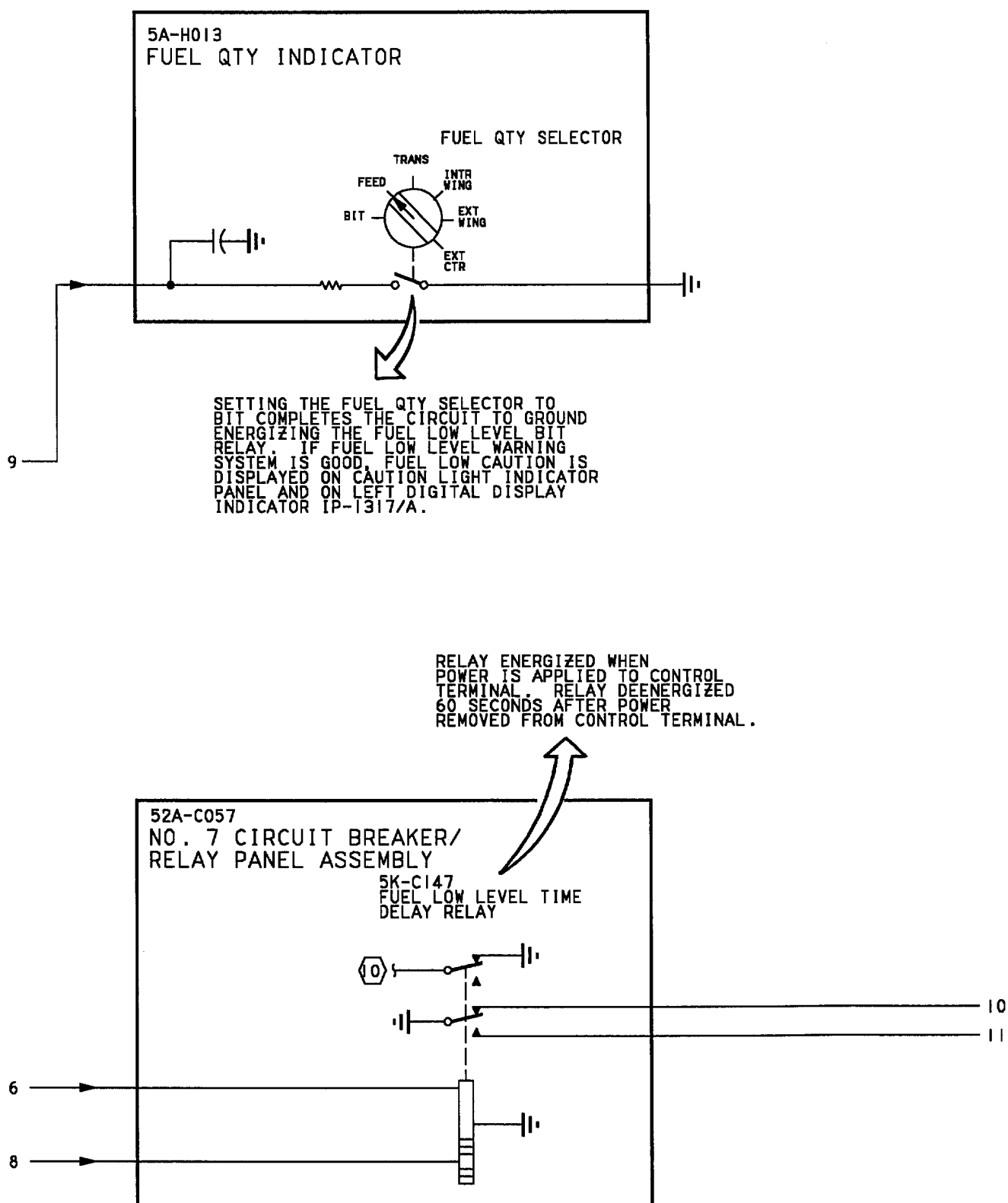
**Figure 1. Fuel Quantity Low Level Warning System Simplified Schematic - 161353 THRU 161761 BEFORE F/A-18 AFC 39 AND 53 (Sheet 1)**

18AC-460-10-(24-1)22-GRID



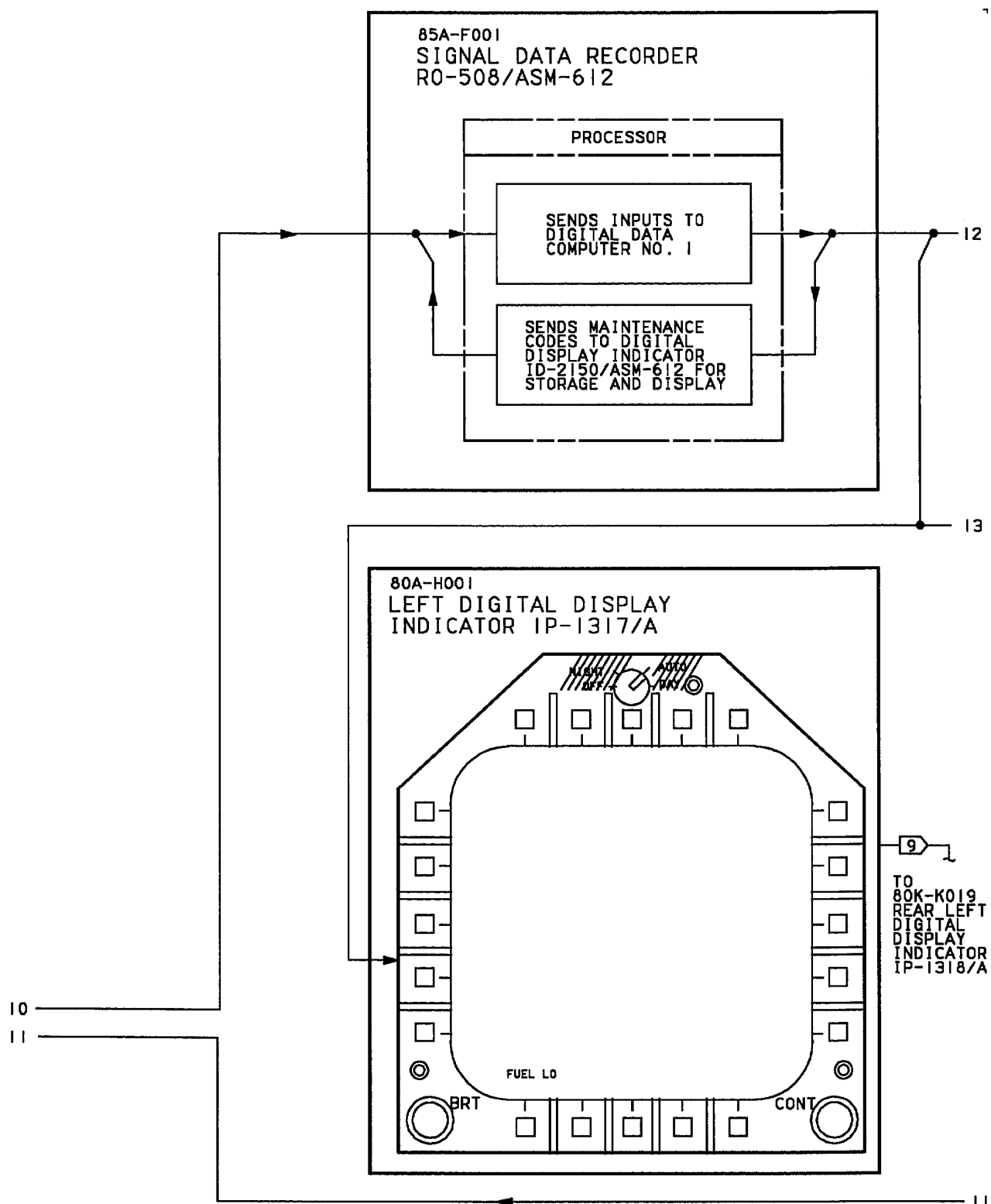
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**Figure 1. Fuel Quantity Low Level Warning System Simplified Schematic - 161353  
THRU 161761 BEFORE F/A-18 AFC 39 AND 53 (Sheet 2)**



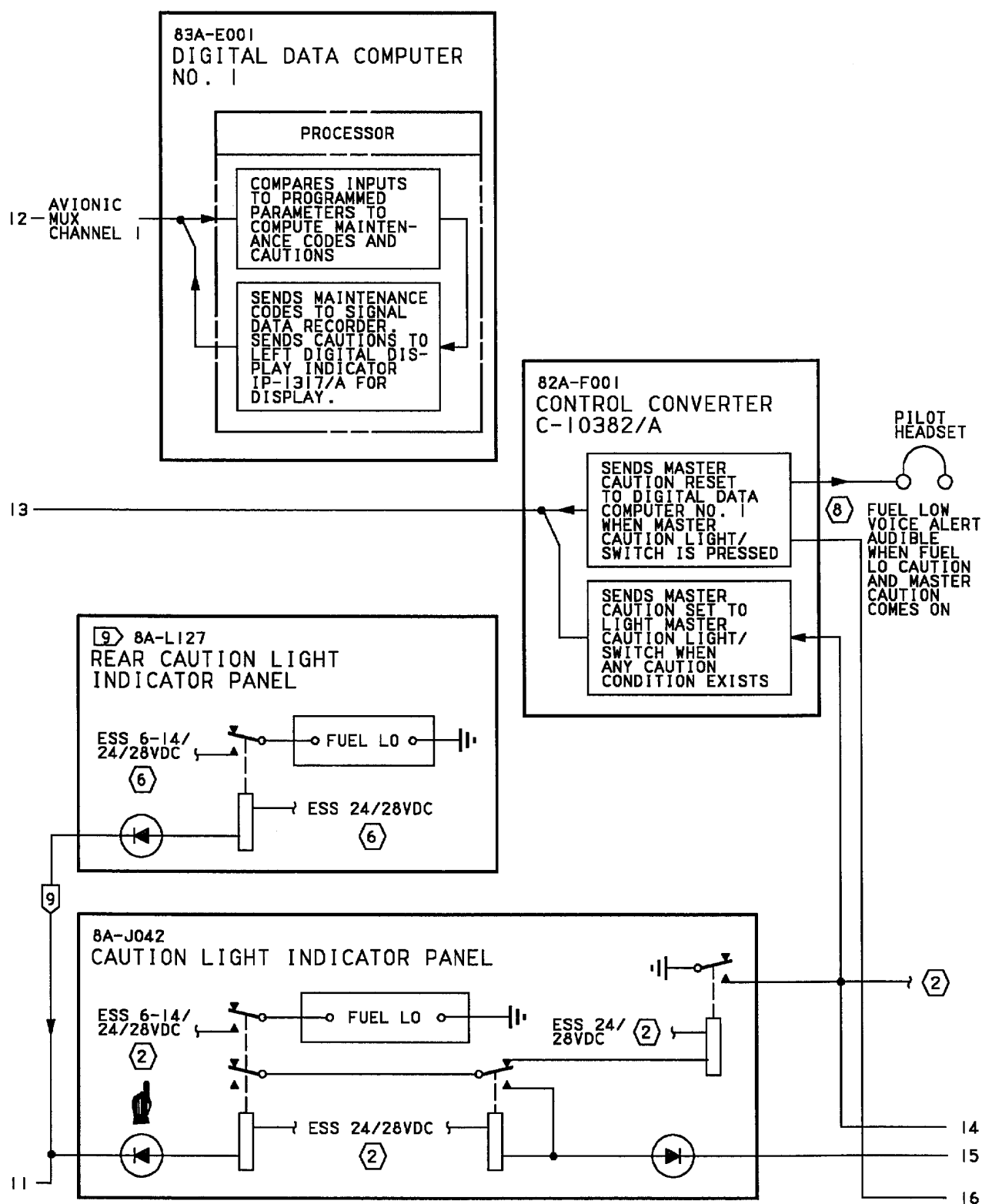
18AC-460-10-(24-3)DPS-GRID

**Figure 1. Fuel Quantity Low Level Warning System Simplified Schematic - 161353  
THRU 161761 BEFORE F/A-18 AFC 39 AND 53 (Sheet 3)**



18AC-460-10-(24-4)DPS-GRID

**Figure 1. Fuel Quantity Low Level Warning System Simplified Schematic - 161353  
THRU 161761 BEFORE F/A-18 AFC 39 AND 53 (Sheet 4)**



18AC-460-10-(24-5)22-GRID

**Figure 1. Fuel Quantity Low Level Warning System Simplified Schematic - 161353  
THRU 161761 BEFORE F/A-18 AFC 39 AND 53 (Sheet 5)**

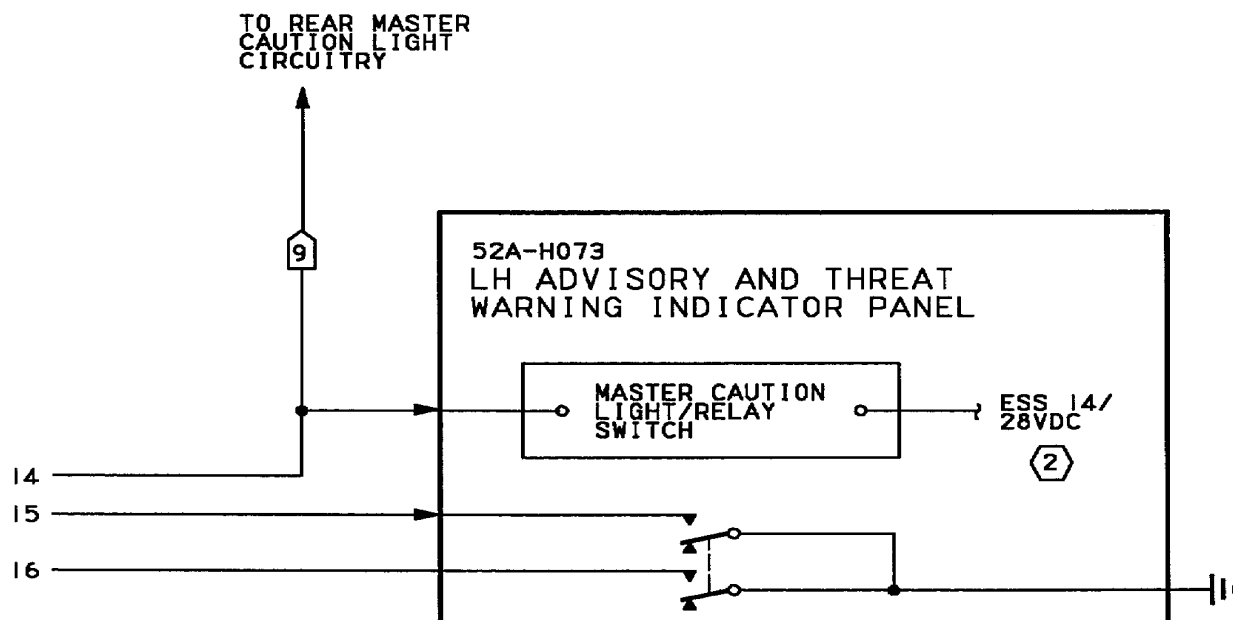


## LEGEND

## 1. NONSTANDARD SYMBOLS

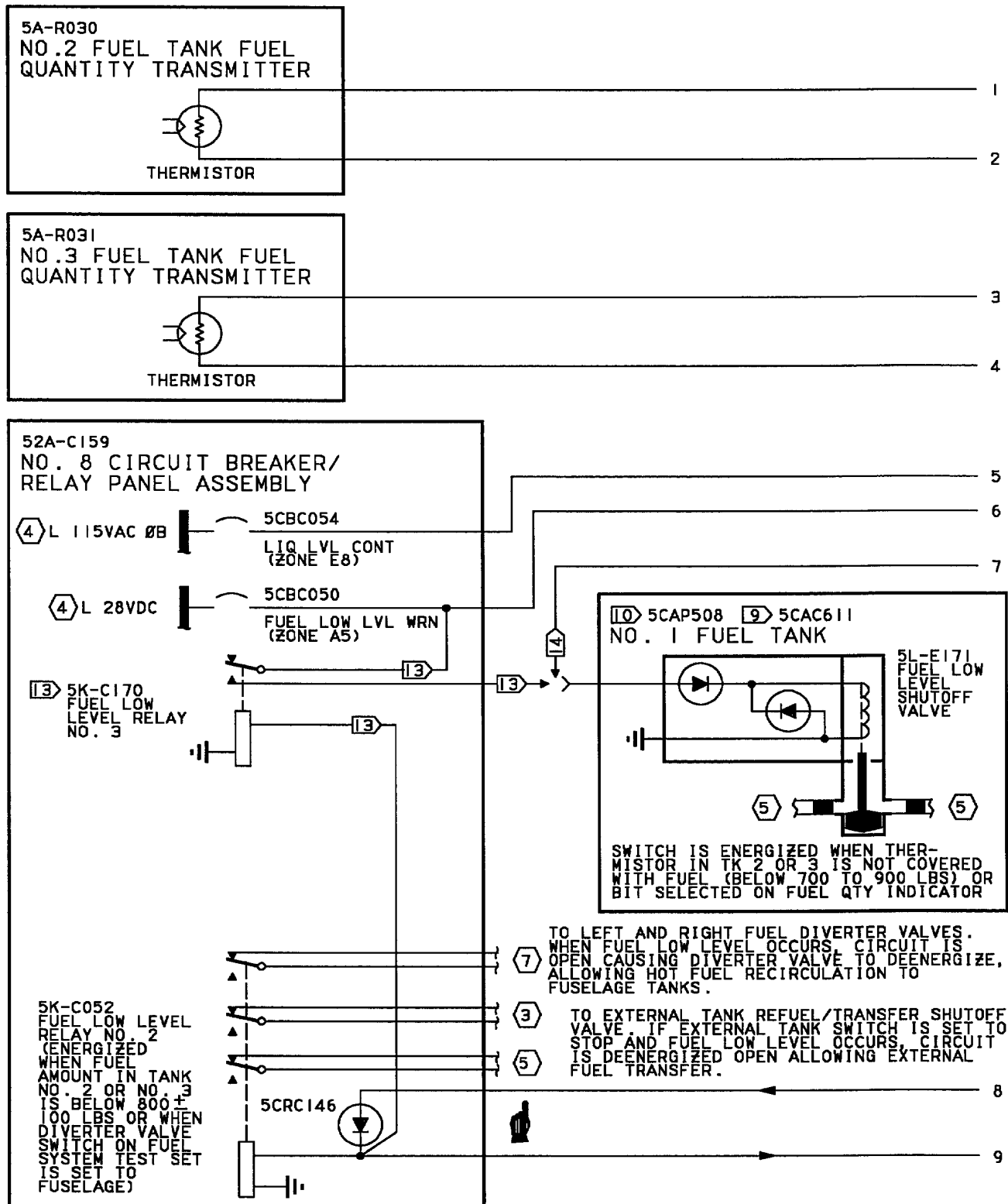


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- ③ EXTERNAL FUEL SYSTEM SIMPLIFIED SCHEMATIC, WP011 00.
- ④ POWER DISTRIBUTION SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-420-100, WP005 00.
- ⑤ INTERNAL FUEL TRANSFER SYSTEM SIMPLIFIED SCHEMATIC, WP014 00.
- ⑥ REAR COCKPIT WARNING/CAUTION/ADVISORY LIGHTING SYSTEM, SIMPLIFIED SCHEMATIC, A1-F18AC-440-100, WP007 00.
- ⑦ HOT FUEL RECIRCULATION SYSTEM SIMPLIFIED SCHEMATIC, WP018 02.
- ⑧ INTERCOMMUNICATION AND AUDIO SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-600-100, WP016 00.
- ⑨ F/A-18B
- ⑩ FUEL DUMP SYSTEM SIMPLIFIED SCHEMATIC, WP017 02.



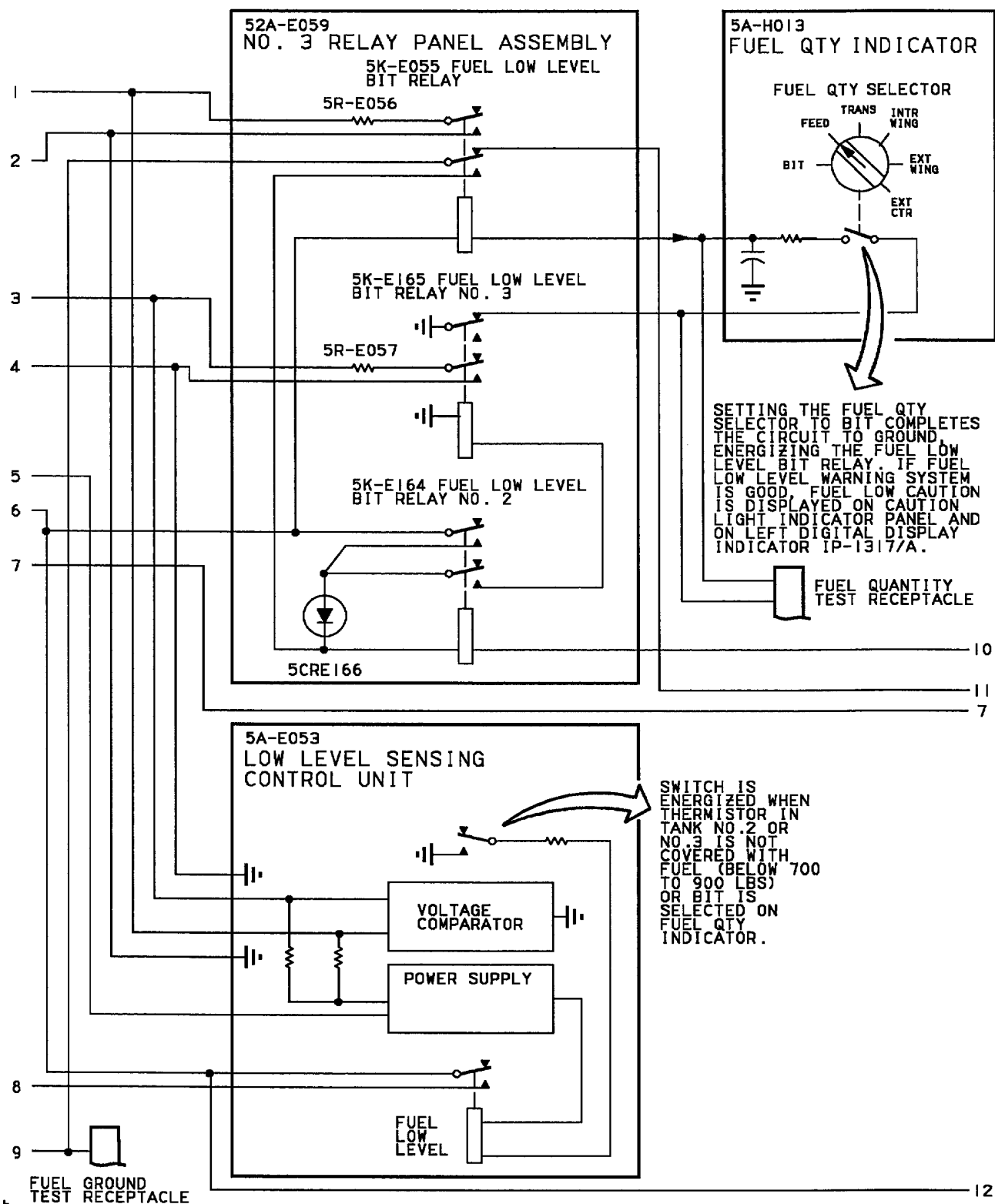
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Figure 1. Fuel Quantity Low Level Warning System Simplified Schematic - 161353  
THRU 161761 BEFORE F/A-18 AFC 39 AND 53 (Sheet 6)



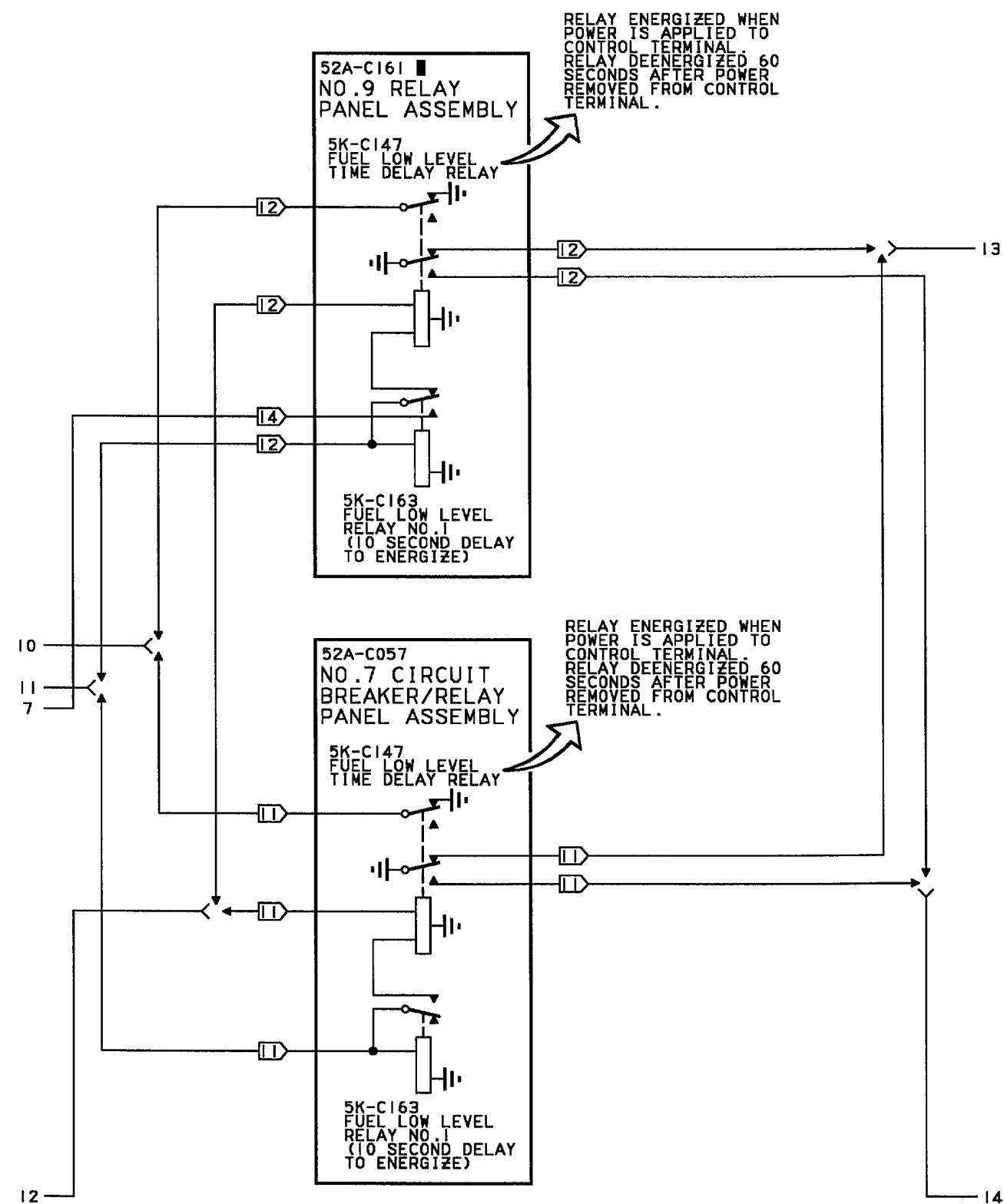
18AC-460-10-(39-1)22-GRID

**Figure 2. Fuel Quantity Low Level Warning System Simplified Schematic - 161924 AND UP (Sheet 1)**



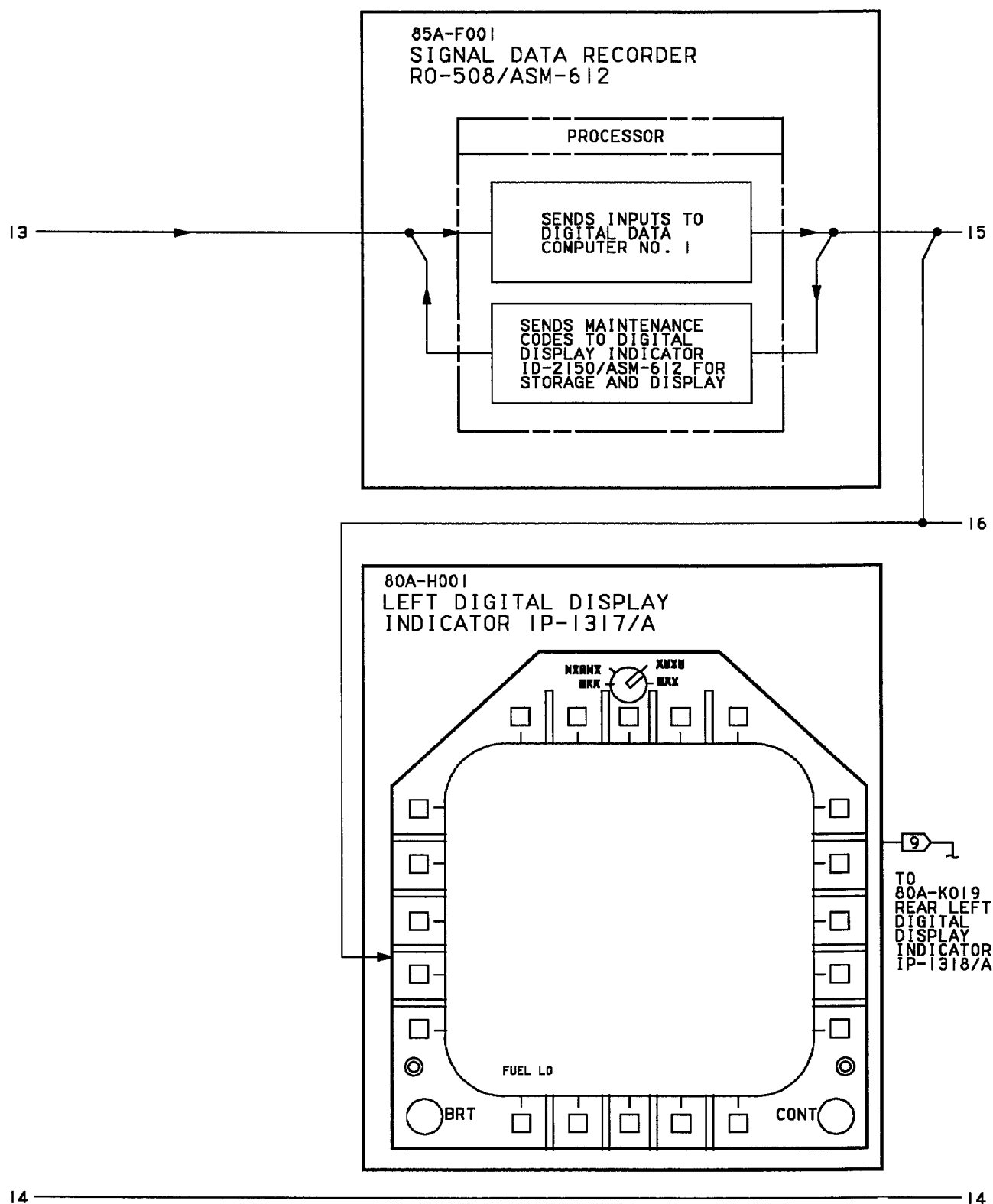
18AC-460-10-(39-2)B-GRID

Figure 2. Fuel Quantity Low Level Warning System Simplified Schematic - 161924 AND UP (Sheet 2)



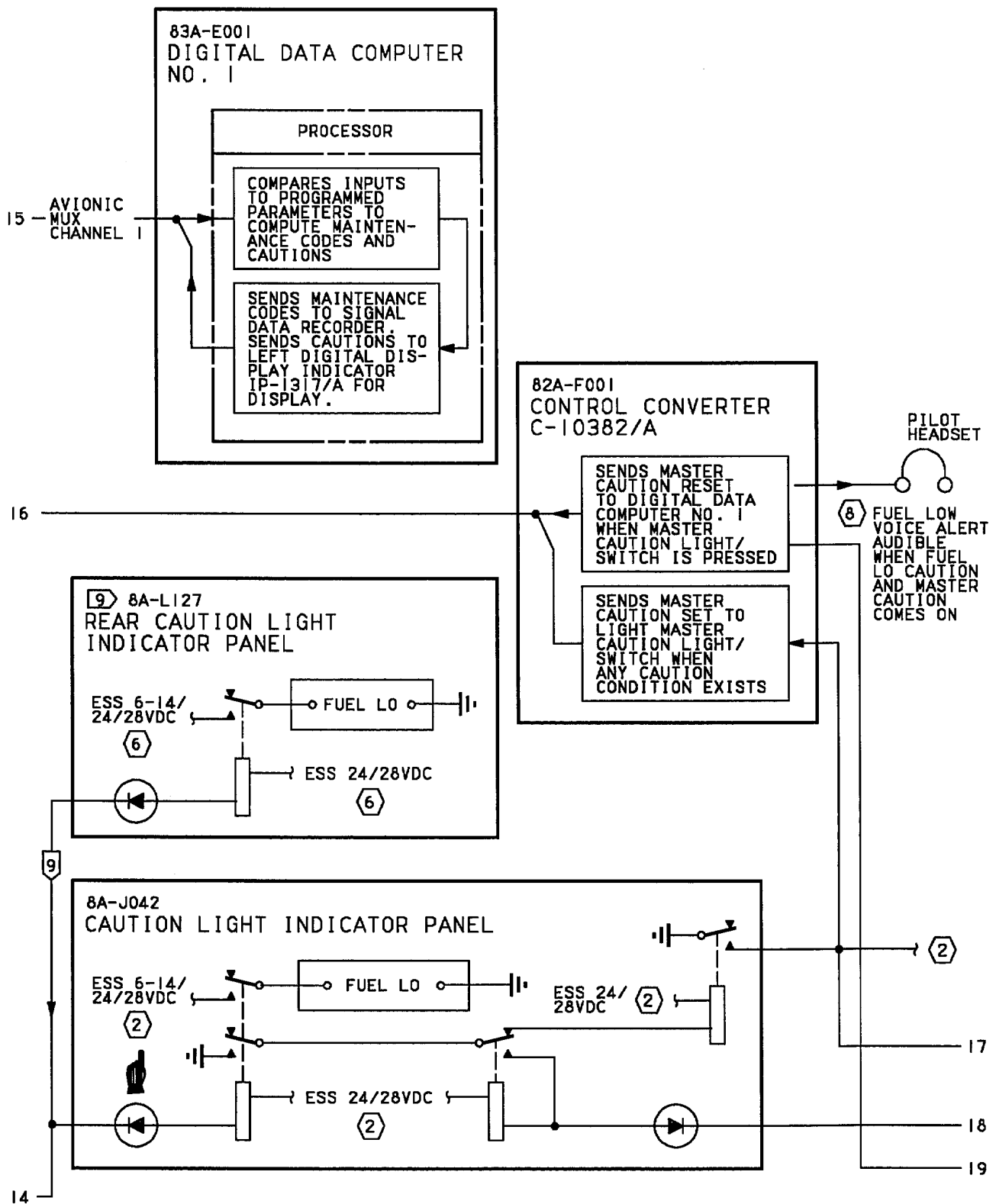
18AC-460-10-(39-3)22-GRID

Figure 2. Fuel Quantity Low Level Warning System Simplified Schematic - 161924 AND UP (Sheet 3)



18AC-460-10-(39-4)BPS-GRID

Figure 2. Fuel Quantity Low Level Warning System Simplified Schematic - 161924 AND  
UP (Sheet 4)

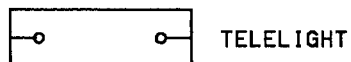


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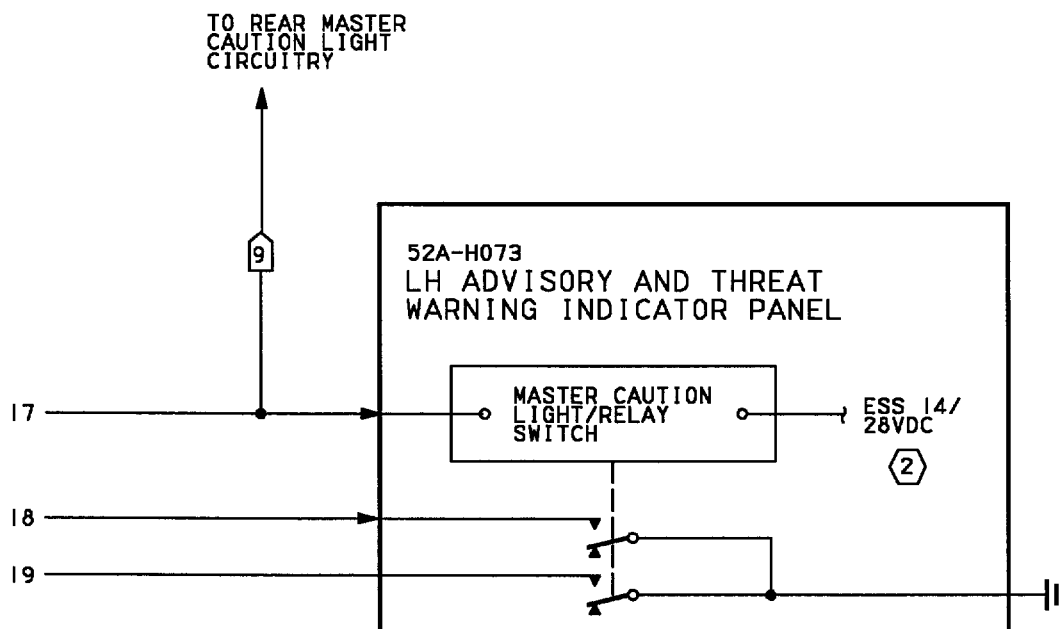
**Figure 2. Fuel Quantity Low Level Warning System Simplified Schematic - 161924 AND UP (Sheet 5)**

## LEGEND

## 1. NONSTANDARD SYMBOLS

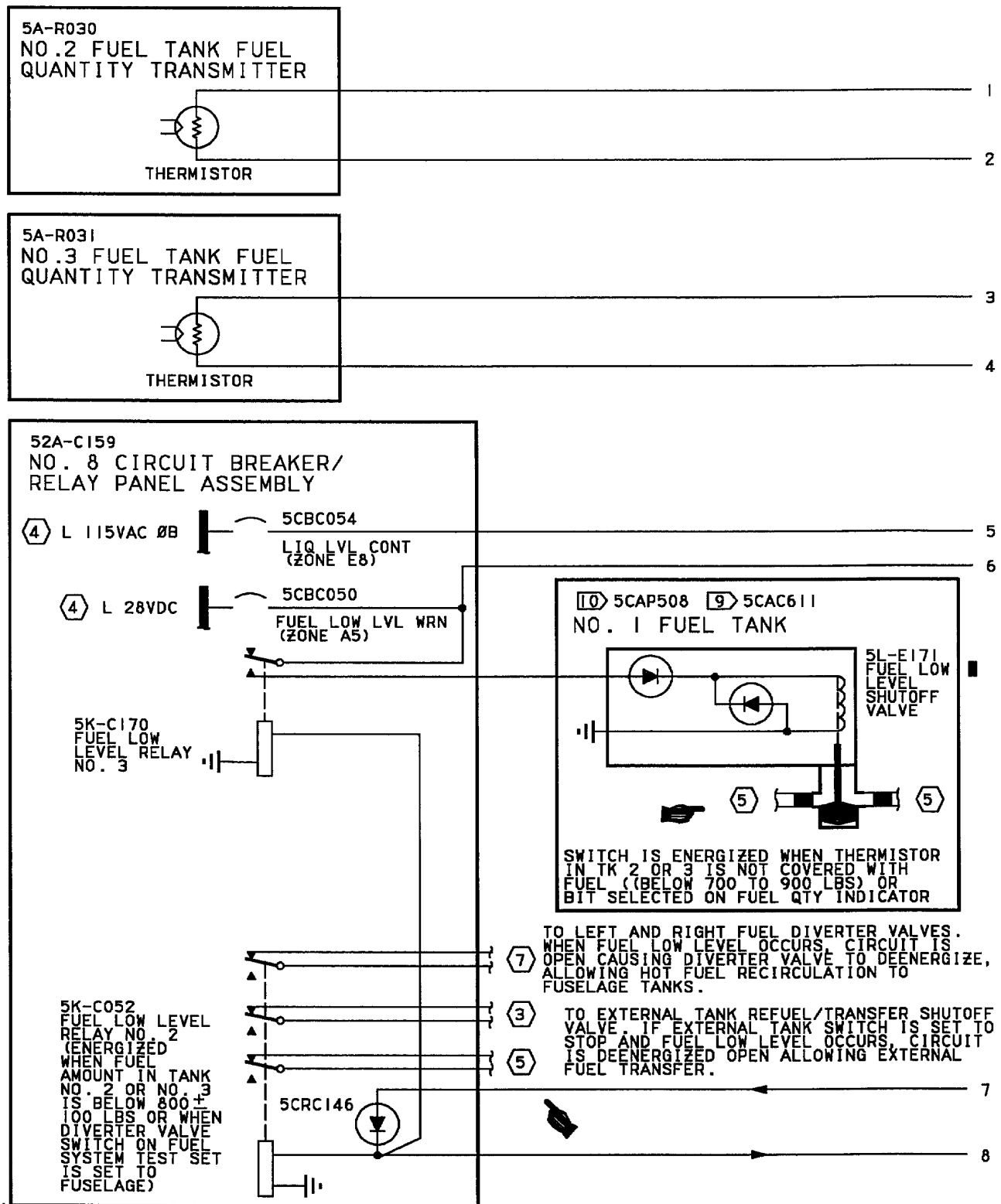


- ② COCKPIT WARNING/CAUTION/ADVISORY LIGHTING SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-440-100, WP006 00.
- ③ EXTERNAL FUEL SYSTEM SIMPLIFIED SCHEMATIC, WP011 00.
- ④ POWER DISTRIBUTION SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-420-100, WP005 00.
- ⑤ INTERNAL FUEL TRANSFER SYSTEM SIMPLIFIED SCHEMATIC, WP014 00.
- ⑥ REAR COCKPIT WARNING/CAUTION/ADVISORY LIGHTING SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-440-100, WP007 00.
- ⑦ HOT FUEL RECIRCULATION SYSTEM SIMPLIFIED SCHEMATIC, WP018 02.
- ⑧ INTERCOMMUNICATION AND AUDIO SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-600-100, WP016 00.
- ⑨ F/A-18B.
- ⑩ F/A-18A.
- ⑪ 161924 THRU 161987.
- ⑫ 162394 AND UP.
- ⑬ 161924 THRU 162477.
- ⑭ 162826 AND UP.



18AC-460-10-(39-6)22-GRID

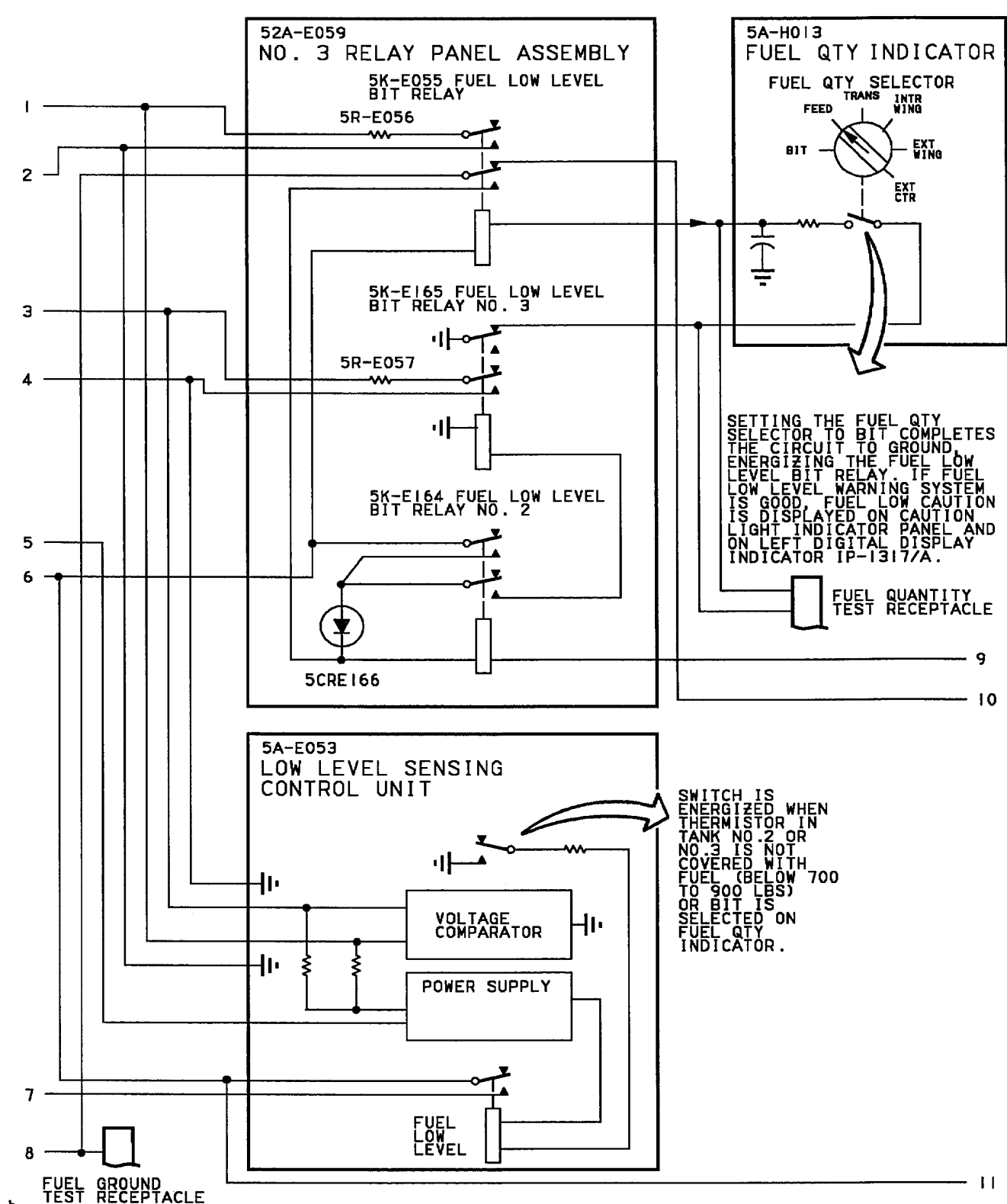
Figure 2. Fuel Quantity Low Level Warning System Simplified Schematic - 161924 AND UP (Sheet 6)



18AC-460-10-(13-1)22-GRID

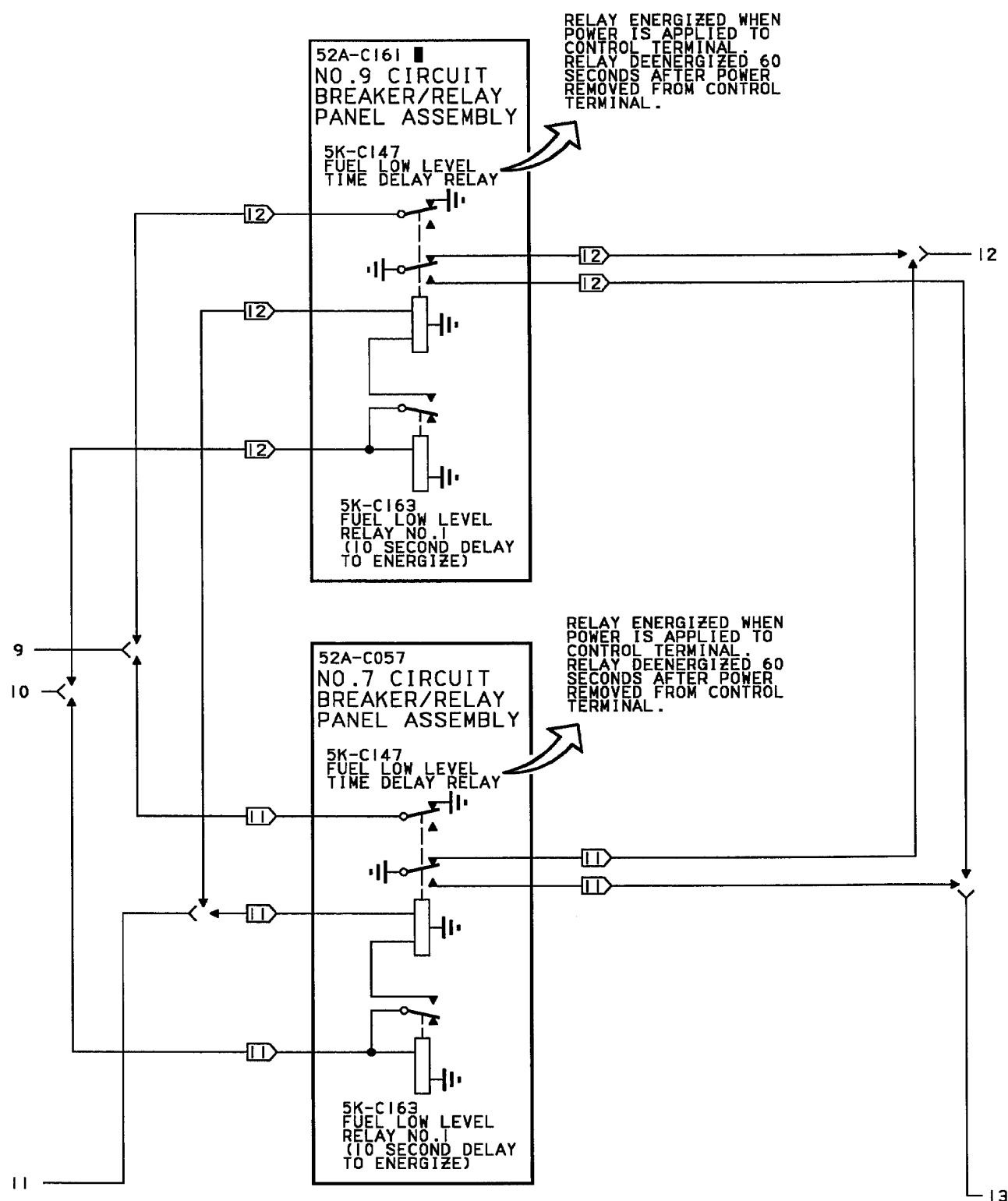
**Figure 3. Fuel Quantity Low Level Warning System Simplified Schematic - 161353 THRU 161761 AFTER F/A-18 AFC 39 AND 53 (Sheet 1)**





**Figure 3. Fuel Quantity Low Level Warning System Simplified Schematic - 161353  
THRU 161761 AFTER F/A-18 AFC 39 AND 53 (Sheet 2)**

18AC-460-10-(13-2)C-GRID



18AC-460-10-(13-3)22-GRID

**Figure 3. Fuel Quantity Low Level Warning System Simplified Schematic - 161353  
THRU 161761 AFTER F/A-18 AFC 39 AND 53 (Sheet 3)**

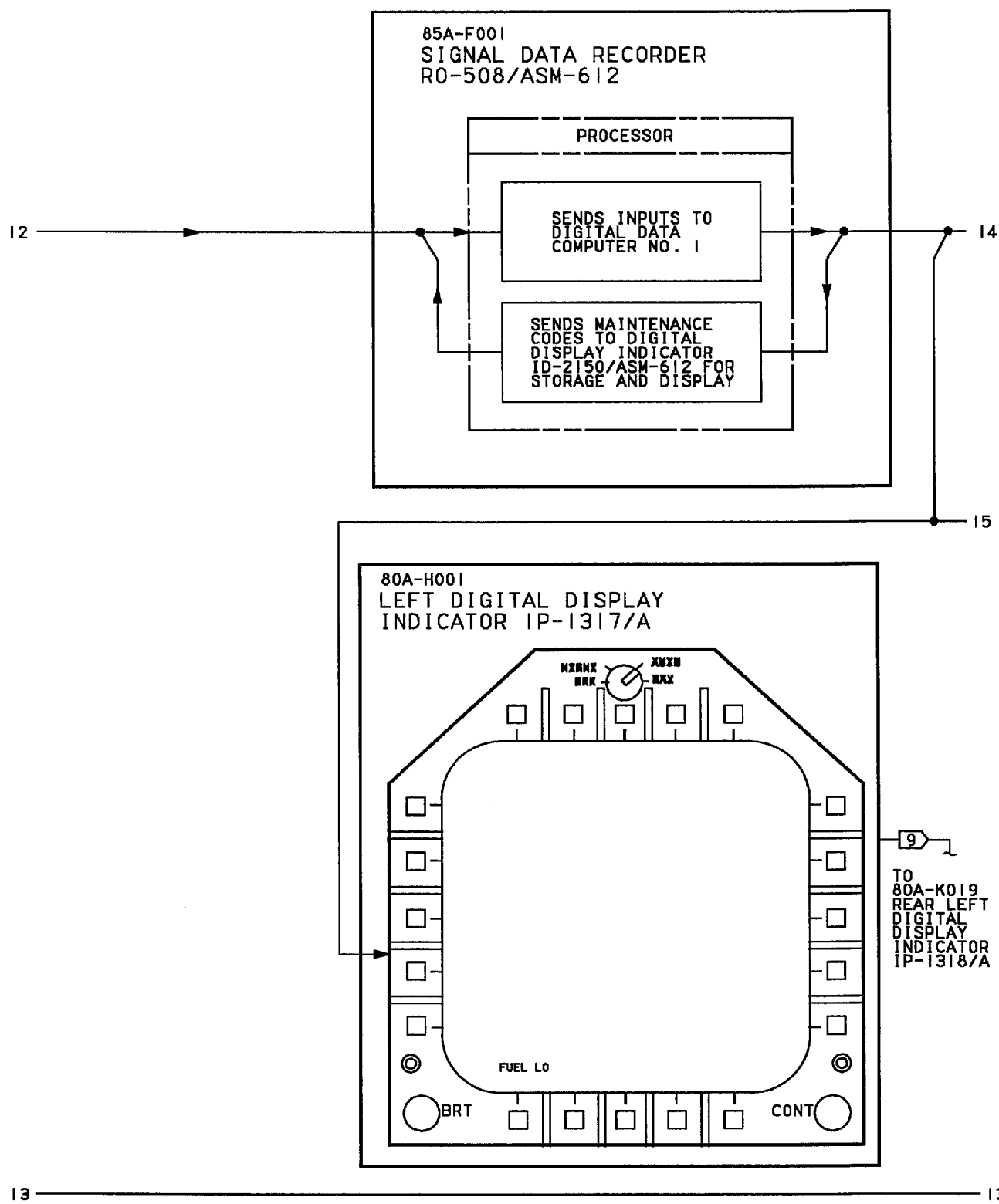
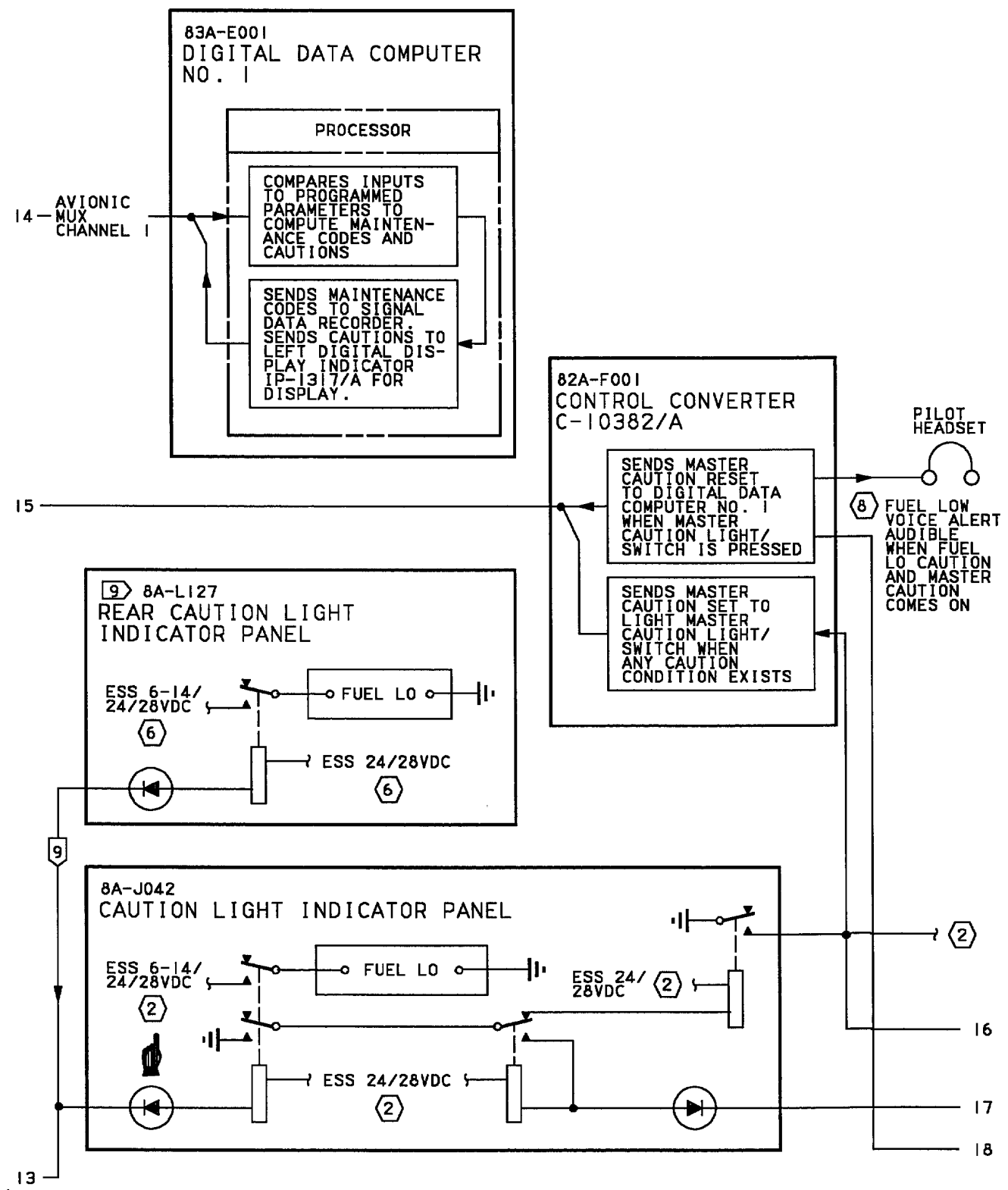


Figure 3. Fuel Quantity Low Level Warning System Simplified Schematic - 161353  
THRU 161761 AFTER F/A-18 AFC 39 AND 53 (Sheet 4)

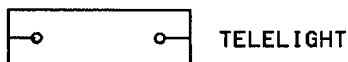


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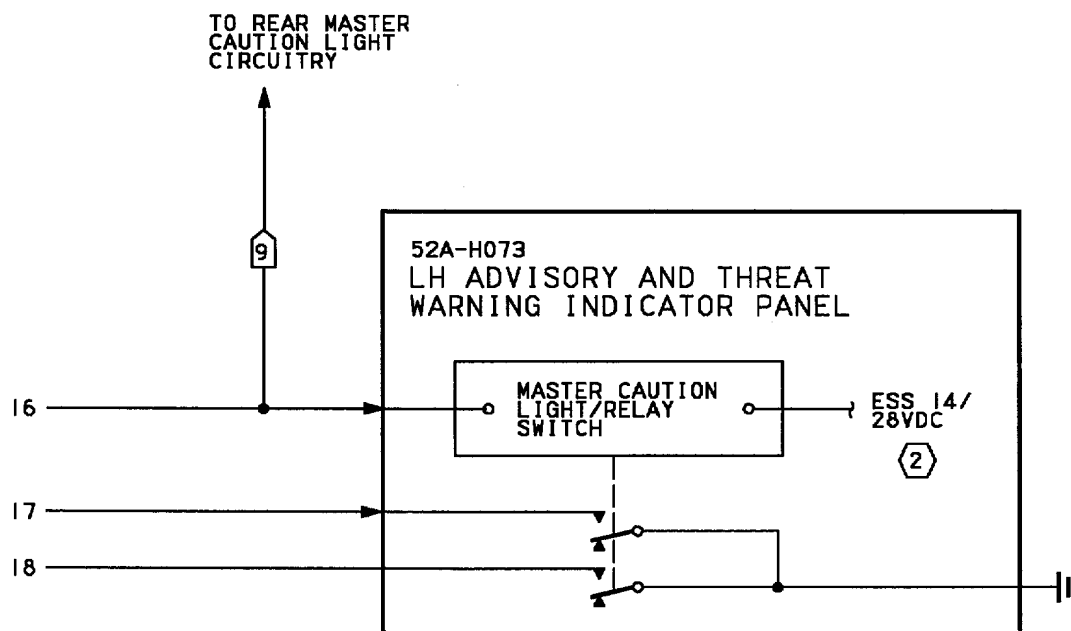
**Figure 3. Fuel Quantity Low Level Warning System Simplified Schematic - 161353  
THRU 161761 AFTER F/A-18 AFC 39 AND 53 (Sheet 5)**

## LEGEND

## 1. NONSTANDARD SYMBOL



- (2) COCKPIT WARNING/CAUTION/ADVISORY LIGHTING SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-440-100, WP006 00.
- (3) EXTERNAL FUEL SYSTEM SIMPLIFIED SCHEMATIC, WP011 00.
- (4) POWER DISTRIBUTION SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-420-100, WP005 00.
- (5) INTERNAL FUEL TRANSFER SYSTEM SIMPLIFIED SCHEMATIC, WP014 00.
- (6) REAR COCKPIT WARNING/CAUTION/ADVISORY LIGHTING SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-440-100, WP007 00.
- (7) HOT FUEL RECIRCULATION SYSTEM SIMPLIFIED SCHEMATIC, WP018 02.
- (8) INTERCOMMUNICATION AND AUDIO SYSTEM SIMPLIFIED SCHEMATIC, A1-F18AC-600-100, WP016 00.
- (9) F/A-18B
- (10) F/A-18A
- (11) BEFORE F/A-18 AFC 48.
- (12) AFTER F/A-18 AFC 48.



18AC-460-10-(13-6)22-GRID

**Figure 3. Fuel Quantity Low Level Warning System Simplified Schematic - 161353  
THRU 161761 AFTER F/A-18 AFC 39 AND 53 (Sheet 6)**

